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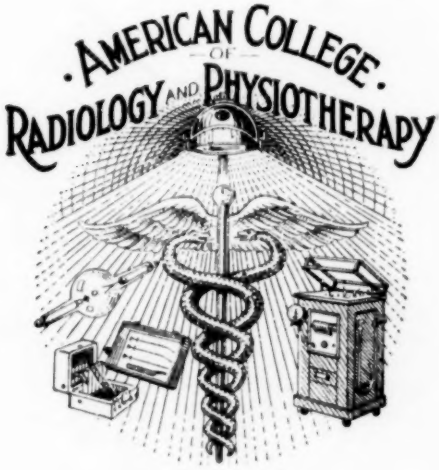

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Diminished Intervertebral Foramina as a Cause of Brachial Neuralgia or Brachial Neuritis*

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New York City.

THE frequency with which roentgenologists are asked to examine the shoulder, arm, forearm and hand, in cases complaining of pain, numbness and tingling in these regions, and the frequency with which one is compelled to make a negative diagnosis of any lesion in these regions that can be diagnosed by means of roentgenology led me, many years ago, to look elsewhere for the cause of these symptoms.

The Brachial plexus and abnormalities, either congenital or acquired, in the bony structure in this region were considered. Cervical ribs, congenital deformities, absence of the first rib or altered relations of the first rib to the clavicle, abnormally long or large transverse processes of the seventh cervical vertebrae were all looked for, but in many instances of brachial neuralgia or neuritis none of these conditions were found.

In 1905, while trying to show an altered relation between the atlas and axis in a case that lost consciousness each time the head was hyperextended, the size and shape of all the intervertebral foramina were accidentally shown. The roentgenogram is also interesting from a historical standpoint, as it was the thirteenth examination made in my office, and this case lead to the study of diminished intervertebral foramina. In 1908 surgical procedure was resorted to in another case for the relief of symptoms due to diminished intervertebral foramina. Since then we have carefully studied a large number of these cases and preserved the roentgenograms without having described them in the literature.

ANATOMY

A very brief consideration of the anatomy which forms the basis of this article may not be amiss.

The first nerve root emerges from the spinal canal above the ring of the atlas, the second nerve root between the atlas and axis, the third through the first intervertebral foramina, the fourth through the second foramina, and so forth. Therefore, the nerve roots do not conform numerically with the foramina through which they emerge. The foramen in the side of the axis, for the transmission of the vertebral artery, should not be misinterpreted as an intervertebral foramen.

The cervical nerve roots, which are eight instead of seven, the first coming from above the atlas and the eighth from below the seventh cervical vertebra, are composed of both sensory and motor fibers. The upper four cervical nerves are distributed to the integument and muscles of the neck and scalp. The fifth, sixth, seventh, eighth and first dorsal form the brachial plexis.

Therefore, symptoms referred to the integument at the point of distribution of any of these nerves may be caused by pressure on the nerve root as it emerges from the foramen.

From the schematic drawings of our anatomies where each color represents a nerve root, it would seem there is such an intermingling of the nerve roots as they pass through the plexus that impulses that pass through one nerve root might be referred to any part of the hand or arm. My experience in interpreting symptoms due to diminished foramina is that the nerves pass through the plexus with less intermingling than these drawings would indicate. The fifth and sixth nerve roots supply the radial side of the arm and hand, whereas the seventh and eighth supply the inner arm, the ulnar side of the forearm, and the little finger.

The intervertebral foramina are formed by the intervertebral notches on the inferior and superior surfaces of the pedicles of two adjacent vertebrae. The foramen is composed of the following structures:

A. Superiorly and anteriorly by the inferior part of the posterior surface of a vertebra.

B. Superiorly by the pedicle of the same vertebra.

C. Posteriorly by the lamina and articular facets and the cartilage lining the facet.

D. Inferiorly and posteriorly by the anterior surfaces of the facet of the lower adjacent vertebra.

E. Inferiorly by the superior surface of the pedicle and body of the lower adjacent vertebra.

F. Anteriorly by the intervertebral disc.

G. Two bones, two joints and a compressible disc form this complex bony forearm through which a bundle of nerves emerge from the spine.

The contour and structure of a cervical vertebra (the fourth) as observed roentgenographically in the lateral direction is worthy of study.

*Read at the annual meeting of Radiological Society, Detroit, Dec., 1922.

The superior articular surface has an inclination forward and the inferior articular surface an inclination backward; so that the inferior articular surface of the body of the vertebra and the inferior articular facet combined form an arch like an articulation for the next inferior vertebra. The anterior surface of the body of the vertebra is straight or even slightly bulged, and the outer surface and inferior surface form a sort of hook. The superior articular surface of the adjacent inferior vertebra is flatter and the hook, just referred to, may account for the frequent antero displacement of the fourth cervical vertebra on the fifth. The straight line of the posterior surface of the body and the smooth lines of the articular surfaces of the body, the facets and the pedicle connecting the body with the vertebra should be studied as observed roentgenographically. The lamina and transverse spinous processes of the opposite side are so superimposed over the anterior part of the body of the vertebra that roentgenograms in this direction are useless in studying the structure or contour of the body of the vertebra. The tip of the transverse processes on the near side of the vertebra and the tip of the posterior spinous process are superimposed, indicating that the angle at which these roentgenograms were made is correct.

TECHNIQUE

Roentgenograms of the atlas, axis and upper part of the third cervical vertebra in the antero-posterior direction, taken through the open mouth, show the odontoid process, the articular processes and the transverse process of these vertebra distinctly.

Roentgenograms of the lower cervical vertebra in the antero-posterior direction are of little value in showing the bodies of the vertebrae; but the length and size of the transverse process of the seventh cervical vertebra is distinctly shown, and is frequently misinterpreted as a rudimentary first rib.

Roentgenograms made in a truly lateral direction are most valuable to show the bodies of the vertebra and their relation to each other, but care should be taken not to misinterpret calcifications of the thyroid or cricoid cartilages or the horn of the hyoid or transverse process of the vertebra as pathological changes in the body of the vertebra.

The size and shape of the intervertebral foramina can only be shown roentgenographically by placing the patient in an oblique position so that the rays pass through or between the lamina of the opposite side and give a clear cut image of the foramen on the side nearest the plate.

The position of the patient, plate, and tube is most important. The patient lies on his side with his arm behind him, the head and neck on a horizontal stand about two inches high, the jaw flat on the plate, the upper shoulder rotated to the front about 48 degrees, and the tube vertically over the fourth cervical vertebra.

The reason for selecting this 48 degree angle is as follows: A line drawn transversely through the body of a vertebra, therefore transversely through the body of the patient, is used as a base line and rays that strike the base line at an angle of 48 degrees run parallel with the inner surface of the lamina of the cervical vertebra. These give a clear cut image of the intervertebral foramina. At this angle the tip of the transverse process and the tip of the posterior spinous process are in line and would be superimposed on the roentgenogram. This is of special importance as the plate itself indicates whether or not the angle is correct.

The angle may range from 38 degrees to 52 degrees without rendering the radiogram useless; but variations in the angle apparently diminish the width of the foramina, but these are all diminished uniformly. In such cases, look for the posterior spinous processes and they will be seen to protrude further back than the transverse processes. The alteration of the angle at which the roentgenograms are made as described above may apparently diminish the width of the foramina.

The rotating of the upper spine out of line with the body, or the body out of line with the upper spine, may apparently alter the breadth of the foramina at the bottom compared with those at the top of the column; but simply turning the head does not alter the foramina. This error in technique may be recognized by the gradual increase in the size of the foramina from below upward.

To clarify my remarks, I will attempt to discuss some observations that could be made on the roentgenographic examination of a normal spine, taken from the various directions.

A roentgenogram made in the lateral direction, shows the alignment of the anterior and posterior surfaces of the bodies of the vertebra. The spacing between vertebrae are equal except between the sixth and seventh where the anterior part of the intervertebral space is increased by an anterior tilting of the seventh cervical vertebra.

A roentgenogram made at about a 43 degree angle with the neck neither flexed nor extended shows the first, second, third, and sixth foramina round in size and shape, all apparently slightly diminished in their antero-posterior dimension by the 43rd instead of 48th degree angle; but the fifth intervertebral foramina is diminished by the tilting of the seventh vertebra forward.

In a roentgenogram of the same patient with the neck hyperextended, made at the correct 48 degree angle, it will be noted that all of the foramina are diminished both in their vertical and transverse axes by the crowding of the articular facets into the intervertebral foramina. The fifth foramen is smaller than the others above. If the spine is hyperflexed, the facets are further apart than normal and the intervertebral foramina are correspondingly increased in size. The fifth is smaller than those above, but the variation is not as apparent as where the neck is neither flexed nor extended.

If the shoulders are in the direct lateral position with the head rotated 48 degrees, all of the cervical vertebrae as far up as the axis will be shown to have retained the same lateral position as the seventh cervical, the rotation being entirely limited to the axis and atlas which have no foramina.

If a roentgenogram is taken of the subject with the body rotated 48 degress but with the head flat on the plate in the lateral direction, the cervical spines, as far as the axis, will appear in the correct 48 degree angle although the side of the head is flat on the plate.

Therefore, it is evident that the body, not the head, controls the an-

gle of the cervical spine, but care should be observed to note that the body, not simply the shoulder girdle, is rotated forward 18 degrees.

PATHOLOGY

Fractures, tuberculosis, malignancy, osteoarthritis, and other lesions of the bodies of the vertebrae or the intervertebral discs are readily recognized and often differentiated from each other by means of roentgenograms made in the lateral or antero-posterior directions; but the lesions which we are considering in this article are a diminution of the intervertebral foramina as such. In these, pathological conditions should be considered as etiological factors incident to the diminished foramina, rather than diseases as such.

Lesions, or even fractures of the bodies of the vertebrae may or may not diminish the intervertebral foramina of the affected vertebrae.

FRACTURES: Fractures of the bodies of the cervical vertebrae are most often the result of hyperflexion, frequently from diving or falling with the head flexed; this results in a crushing or chipping of the anterior part of the body of vertebra with it's riding forward on the adjacent inferior one or an over-riding or anterior displacement of the adjacent superior vertebra. If this deformity is not reduced, the posterior spinous ligaments are put on a stretch, the adjacent lamina and facets are separated, and the corresponding intervertebral foramina are increased rather than diminished.

If the fracture is through the lamina, pedicle, articular facets, or the posterior part of the body of a vertebra, and the anterior part of the body of the vertebra is intact, there may or may not be pressure on the nerve roots at the time of the fracture; but the symptoms in the cases develop weeks or months later, due to the formation of callus which encroaches on the lumen of the intervertebral foramina, and causes pressure on the nerve roots.

The following case illustrates this type of injury: A woman was in an automobile accident and sustained a severe Pott's fracture of the ankle and slight injury to the lumbar spine. She was confined to bed with her ankle injury and the symptoms referred to the spine completely subsided, but in about two or three months she began to complain of pain radiating down the thigh and leg which increased until it was unbearable. The case was seen by Dr. Allen Star and an x ray examination of the spine was suggested. This revealed a fracture of the lamina of the fourth lumbar with exuberant callus; surgical procedure was recommended based on the roentgenological diagnosis and the symptoms were completely relieved.

TUBERCULOSIS: Tuberculosis is evidenced by the destruction of bone in a joint lesion, gradual in its onset with softening of the bone. The alteration in the bodies of the vertebrae may occur, but the nerve makes room for itself in the soft degenerated tissue and pressure is less likely to result than with some other bone lesions.

MALIGNANCY: Malignancy may involve the laminae as well as the bodies of the vertebrae, but it is usually a fairly rapidly progressing process. Diagnosis is based on antero-posterior and lateral films and although there may be a diminution of the intervertebral foramina with pressure on the nerves, it is of secondary importance although the direct cause of the symptoms of which the patient complains most bitterly.

OSTEOARTHRITIS: Osteoarthritis is a common cause of diminished foramen. The osteoarthritis of the cervical region has a special affinity for the fifth, fourth and sixth vertebrae. Whether this affinity is due to the anatomical relation of the vertebrae to the tonsils, because of their rather common nerve and blood supply and lymphatic drainage, or to the patient's sleeping on a high pillow with the neck hyperflexed, combined with some source of local infection or even to some other cause, I am unable to state; but I would emphasize the peculiar affinity of these three vertebrae and suggest that it might be the key that would solve the etiology of osteoarthritis in general. When these fourth, fifth and sixth cervical vertebrae are examined in a true lateral direction, the bodies of the vertebrae have a characteristic deformity—namely, the flattening of the body of the vertebrae with concavity of its anterior surface, and protrusion anteriorly and posteriorly of the articular surfaces, which has been referred to as lipping. This lipping also involves the articular surface of the facets which form the posterior surface of the intervertebral foramina.

Coincident with these changes in the bodies of the vertebrae, there is a thinning or destruction of the intervertebral discs which allows the adjacent vertebrae to approximate and perhaps lie in direct contact with each other. The compression and destruction of the cartilage, and the diminution in the thickness of the bodies of the vertebrae themselves, allow a sliding forward and backward of the adjacent vertebrae on each other. There is nothing new or interesting in these findings, so far, except possibly the peculiar affinity of this osteoarthritis process to the fourth, fifth and sixth cervical vertebrae; but when these lesions are compared with the normal spine in a position to show the intervertebral foramina there is opened up a very fertile field for study.

Roentgenograms of the articulated cervical spine and various vertebrae in a lateral and oblique direction demonstrates the deformity of the involved vertebrae compared with the normal ones better than the photographs, although colored photographs would show the whitened chalky appearance of involved vertebrae better than roentgenograms.

Observing the entire cervical and upper dorsal vertebrae in the lateral direction, it will be noted that the upper four vertebrae are practically free from the osteoarthritic process. In fact, they differ so greatly from those below that one might think that they did not belong to the same spine.

The fifth, sixth, and upper part of the seventh are markedly involved. The fact that the upper part of the seventh vertebrae is involved and the lower not, indicates a sharp line of demarkation of the process.

Oblique roentgenograms of the same spine in the state of flexation show the intervertebral foramina distinctly; but the muscles and ligaments being absent, the intervertebral foramina are longer than they would be in a live subject with the same lesion.

The normal fourth cervical vertebra, which we previously studied, will now be compared in the lateral direction with the fifth and sixth cervical vertebrae which is arthritic. The altered shape of the body, the roughening of its articular surface, the lipping anteriorly and particularly posteriorly will be noted.

Likewise the normal intervertebral foramina between the third and fourth vertebrae are to be compared with the foramen between the two osteoarthritic vertebrae. The destruction or thinning of the intervertebral discs, and the actual flattening of the bodies of each of the vertebrae, cause the pedicle of the vertebrae to be closer together in diseased vertebrae and thus the intervertebral foramen is definitely shortened in its vertical axis; the lipping anteriorly or even laterally is not of great clinical significance. However, the lipping on the posterior surface of the bodies of the vertebrae and anteriorly from the articular surface of the facets encroaches upon the lumen of the foramen in the horizontal or antero-posterior axis of the foramen. Therefore, the foramen is diminished from above downward, and from before backward. Sometimes the lipping almost divides the foramen into a figure eight or two smaller foramen.

Direct lateral and oblique roentgenograms of the normal and three involved vertebrae show the characteristics of the pathological process compared with the normal one, the relation of the normal vertebrae to each other and the pathological vertebrae to each other, and one normal foramen above and below the diminished foramen.

A roentgenogram made in 1906, which I have in my possession, demonstrates two things:

First: The lipping and deformity of the body of the two adjacent vertebrae;

Second: That sixteen years have elapsed without rushing into print on this subject.

MISALIGNMENT OF THE VERTEBRAE: Misalignment of the vertebrae is a question which has caused considerable discussion. The misalignment of the posterior spinous processes usually does not indicate a misalignment of the bodies of the vertebrae. The misalignment in which we are especially interested is antero-posterior displacement of the body of one or two vertebrae compared with those above and below.

The direct lateral position with the neck neither flexed nor extended best shows the antero-posterior relation of the bodies of the vertebrae. This might not be of any roentgenological or clinical significance if it were not for the complexity of the intervertebral foramina between the displaced vertebrae and the two adjacent vertebrae which are in a normal position compared with the others.

Roentgenograms made in the oblique direction of this case show definite evidence of an antero-posterior diminution of the intervertebral foramina with normal sized foramina above and below.

ROTATION: The lateral deviation of a posterior spinous process, compared with those above and below it, does not mean lateral displacement of the body of that vertebra and may not even indicate a rotation of that vertebra. The fact that one vertebra may be rotated on another is definitely demonstrated by stereoscopic roentgenograms of the lumbar region, and, although more difficult to show, I believe that the same rotation does occur in the cervical region, particularly in the axis and atlas. Such a rotation with slight lateral tilting would, if it occurred in the lower cervical region, account for the diminished foramina on one side without morphologic changes in the body of the pedicle or facets of the vertebra.

LOCALIZED HYPEREXTENSION: Earlier in this article, when technique was being considered, it was demonstrated that all of the cervical intervertebral foramina could be diminished in both their vertical and horizontal axis by hyperextension of the neck and increased by hyperflexion.

From a re-study of all the cases of diminished intervertebral foramina collected during the past seventeen years coincident with the preparation of this article, the one outstanding fact that we have elicited is, that there may be diminished intervertebral foramina in a localized area of the spine caused by a localized hyperextension of that portion of the spine. In these cases usually more than one foramen is diminished. An acute hyperextension of one vertebra, as compared with the adjacent vertebra beneath it, may cause a contraction of a single intervertebral disc.

We may now consider some of these cases of local or even general hyperextensions of the cervical region. There may be a flattening or wedge shaped body of the seventh vertebra or first dorsal. This would give forward inclination to the cervical spinal column and in order to hold the head erect there would be a compensating hyperextension either of some or all of the cervical vertebrae with a diminution of the corresponding intervertebral foramina.

The same type of compression or flattening of the anterior part of the dorsal vertebrae, particularly in the region of the fourth and fifth dorsal vertebrae, is observed in most cases of round shoulders and in these cases there is also compensating hyperextension of the cervical region, usually more general than localized.

I believe that localized contraction of the deep cervical muscles may also cause localized hyperextension, but there is no roentgenological evidence of this etiological factor to prove this conclusion.

SYMPTOMOLOGY

The symptoms of the classical cases are so characteristic that one can usually make a diagnosis over the phone. The request is made for x ray examination (too often a picture) of the shoulder, arm, eblow, and some part of the hand, often the little and ring finger. In such a case, my secretary will usually ask permission to examine the neck as well.

The classical history is as follows: Pain, numbness or tingling, sudden in onset involving the shoulder girdle running down either the outside of the arm to the thumb, or down inside the arm terminating in the little finger, and sometimes in the elbow. The patient usually attributes it to some definite accident, muscular strain, or manipulation, such as: hitting the head against the top of an automobile when going over a bump; a suit case falling from the rack in a railroad train; diving, or falling on the top of the head; unusually muscular exercises, such as the daily dozen, performed with more vigor than the age of the patient would warrant; severe

osteopathic manipulation; active deep massage; or looking up too quickly, as to see a ball during golf serving.

In a few cases, the period between the trauma and the onset of the symptoms is so great that the patient may not have remembered the trauma until questioned concerning it. In some cases there is a cracking or grinding sensation in the neck when the patient moves his head, in others this is absent. The pain may be relieved by posture of the head or neck.

The duration of the symptoms depends on the pathology at the site of the diminished foramina.

TREATMENT

Never yet have I demonstrated these diminished intervertebral foramina to physicians, surgeons or orthopedist that he has not said, "Well, what can be done for it?"

Perhaps some time later before a Surgical or Orthopedic Society I may consider this subject from the clinical standpoint and venture to suggest methods of treatment for some of these cases.

That these cases are of frequent occurrence, that they have occurred in the past, and are occurring at the present unrecognized, is brought to my mind by an instance that happened when I was twelve years old. My father, in my presence, was bending a small piece of iron tubing and he complained suddenly of a sharp pain in the right shoulder and extending down to the right hand. This continued to trouble him for several years or until death ensued from an intercurrent disease, pneumonia.

PROGNOSIS:

In some cases fractures of the pedicle and lamina if untreated, the prognosis is bad, but if treated surgically the prognosis is good. The prognosis in a case of malignancy is bad; while in cases of osteoarthritis, there are periodical recession and exacebation of the symptoms. In cases of tuberculosis, ossification precedes, and the reparation process usually terminates in ankylosis.

The Treatment of Cancer of the Tongue by the Implantation of Bare Glass Tubes Containing Radium Emanation; With a Report of 30 Cases*

FRANK EDWARD SIMPSON, A. B., M. D.,
Chicago, Illinois.

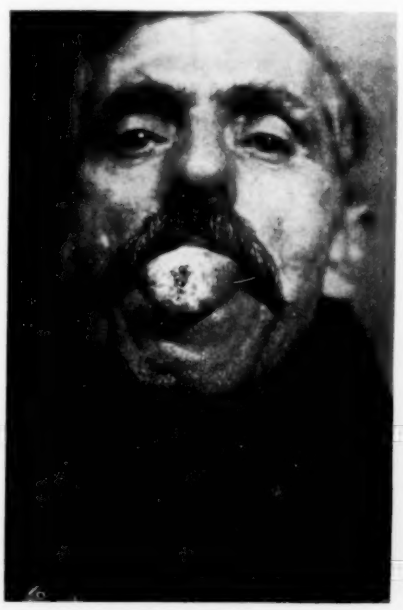
IT is my object in this brief discourse to put forth some observations that have been brought to my attention during my practice, citing specifically thirty consecutive cases, and explaining as concisely as possible the manner of treatment and the results obtained.

TREATMENT

Treating the Tongue Lesion.

Preliminary surface radiation was used.

Under local anesthesia the tongue was infiltrated with from 5 to 38 glass ampules, each ampule containing approximately 0.5 mc. of radium emanation, the number of ampules depending upon the size of the tumor. We have not yet seen a lesion that we thought was made worse by this treatment and there has been no failure of any tongue lesion to heal when the growth could be treated under direct vision. In two cases in which the base of the tongue was involved, the lesion did not completely heal, due perhaps to faulty technique.



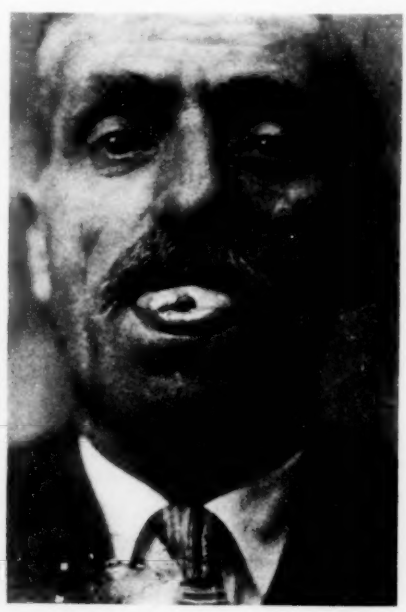


Fig. 1—Male, age 50. Carcinoma of the tongue. Lymph nodes were palpable and on microscopic section showed carcinoma. Photo taken February 13, 1923.
Fig. 2—Patient in Fig. 1, showing the results after radium treatment. Has been well over 1 year and 9 months. Photo taken May 29, 1923.

*Read at the third annual meeting of the American College of Radiology and Physiotherapy, Chicago, November 13, 1921.

We have abandoned, except in very rare instances, all other methods of using radium in tongue cancer.

Treating the Cervical Glands.

As a routine measure, within from three to five days after the treatment of the tongue lesion, the adjacent glands of the neck on both sides, whether palpable or not, received very heavy surface radiations. The most common technique consisted in the use of from 500 to 1,500 mc. arranged on a block applicator measuring 4 by 4 by 3 cm. The block applicator was surrounded, as a rule, on the four lateral surfaces by a band of lead 3 mm. thick. Using from 500 to 1,500 mc., an exposure of approximately 7,000 mc. hours may be given. A sharp skin reaction was produced by this technique. It required from two to six or more treatments to radiate the neck properly, each skin area received one exposure. The interval between the neck treatments depended upon the condition of the patient, especially upon the amount of radiation sickness produced. Intervals of from four to five days between the treatments have been common.

In three cases, the neck was opened and the glands were infiltrated with bare emanation tubes, but in these cases the surface radiation was reduced by one-half.

We are not certain as to the best method of treating the cervical glands. Many more cases must be treated and a longer period of time must elapse before this point is settled. When the carcinoma has definitely involved the cervical glands, the prognosis is serious under any plan of treatment. If patients do well under treatment and survive for one year without definite recurrence in the tongue or the cervical glands, they have about an even chance of remaining well.

Table 1 gives in a concise manner the history of 30 unselected cases of cancer of the tongue, treated during a period of 5 years (1919 to January 1, 1924):

Surgical Type of Case		Glandular Involvement		Age and Sex		Previous Treatment	
Favorable	2	Without evident glandular involvement	18	*Ages*		Operative removal with recurrence in tongue	3
Unfavorable	19	With probable or certain glandular involvement	12	20 to 30	1	Inadequate radium treatment with recurrence in tongue	4
Inoperable	9			30 to 40	0	Electrolysis	1
				40 to 50	5	Abrams vibration treatment	1
				50 to 60	9	Miscellaneous such as caustics or untreated	21
				60 to 70	10		
				70 to 80	1		
				80 to 90	1		
				Total	30		
				Sex			
				Males	27		
				Females	3		
Total	30	Total	30	Total	30	Total	30

Table 2 shows the results of the treatment of the 30 cases appearing in Table 1.

COMMENT

Cases That Have Apparently Recovered.

Out of a total of 30 unselected cases included in this report 20 are living. In 16 cases the apparent recovery has lasted for over a year, 4 cases have persistence or recurrence of the disease in the neck, and 1 case has been lost sight of. We have no doubt that the lapse of time will show a higher mortality than is now apparent.

Cases That Have Died Since the Treatment.

None of the 9 cases that have died since the treatment were of the favorable or operable type; 3 of these 9 cases recovered clinically and were well for about one year—1 dying from a hernia operation and 2 of recurrence of the disease in the neck. In three other cases, the base of the tongue was involved and the cervical glands were large and fixed. In these three cases, it was necessary to use the laryngeal mirror in order to implant the ampules in the tongue lesion. In the seventh case, the tongue lesion was not unfavorable, but the cervical glands were large and fixed. In the eighth case, recovery was anticipated, although the floor of the mouth was involved by the lesion. Death occured, however, two months after the treatment from the development of a sublingual abscess while the patient was under the care of another physician in another city. In the seventh case, the patient became mentally de-

Site of Tongue Lesion		Method of Treating Cervical Glands		Number of Recoveries and Duration of Apparent Cure		Number of Deaths and Duration of Life After Treatment	
Anterior ⅓ of tongue	2	Surface radiation of neck	27	Well for over 5 yrs.	2	Lived over 1 year	3
Middle ⅓ of tongue	19	Surface radiation with implantation of ampules in glands	3	Well for over 3 yrs.	3	Lived over 6 months	4
Posterior ⅓ of tongue	9			Well for over 2 yrs.	2	Lived over 3 months	2
				Well for over 1 yr.	9		
				Disease persisting or recurring	4		
				Not traced	1		
Total	30	Total	30	Total	21	Total	9

ranged, refused food and died of inanition.

ADVANTAGES AND DISADVANTAGES

Advantages of Radium Emanation Treatment.

1. There is no operative mortality. Under surgery a certain mortality due to the operation is usually experienced. Judd and New's operative mortality in 118 cases was 0.84 per cent, but their cases were very carefully selected. Bloodgood's operative mortality in 160 cases was five per cent in early cases; 30 per cent in advanced cases.

2. The functions of the tongue, speech, deglutition, etc., remain practically unimpaired.

Disadvantages of Radium Emanation Treatment.

1. The pain due to a severe radium reaction is not inconsiderable and is sometimes severe enough to require opiates.

2. Hemorrhage from the lesion may occur subsequent to the treatment. In two of our cases there was moderate, but not alarming, hemorrhage from the site of the lesion during the reaction period. In one case it occurred three weeks and in the other case ten days after the implantation of the ampules. It is usually brought on by injudicious attempts to remove the slough. Hemorrhage may be controlled by the local application of a styptic and injections of horse serum.

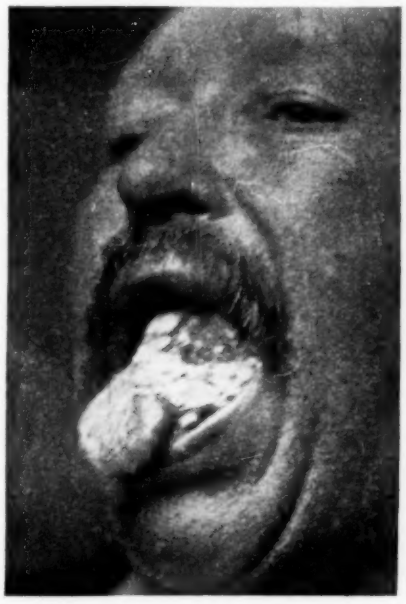
CONCLUSIONS

1. While conclusions based upon the reports of comparatively few cases must be accepted with caution, we believe the results justify the use of emanation ampules in doubtfully operable and in selected inoperable cases.

2. Certain cases that are hopelessly advanced should either not be treated at all with radium or receive only palliative treatment as the results will not compensate for the suffering that may be caused by radium effects.

3. Operable cases may still have the benefits of surgical excision, although we believe the use of the emanation ampules combined with massive radiation of the cervical glands will give equally good and perhaps better results.

59 E. Madison St., Corner Wabash Ave.



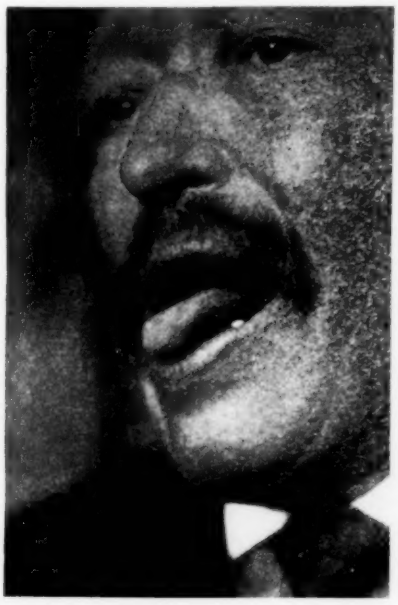


Fig. 3.—Male, age 64. Carcinoma of the tongue. Lymph nodes were palpable and on microscopic section showed carcinoma. Photo taken July 7, 1921.

Fig. 4.—Patient in Fig. 3, showing the results after radium treatment. Has been well over 3 years and 4 months. Photo taken November 1, 1924.

Report on Diathermy in Urology*

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BEFORE enumerating some of the genito-urinary conditions particularly amenable to diathermy, allow me to quote a paragraph written by one of the most foremost urologists in America, Dr. Victor Cox Pedersen, that appealed very greatly to me.

"This contribution is not a brief in behalf of or an apology for electrotherapy. Adverse critics, obviously, either have no equipment at all, or one that is inadequate. They, therefore, have not had the experience which makes their opinion reliable or final. It is a poor argument to say that other methods will do as well. It is our function to be skilled in all methods available, because in such infections of the mucosa as the gonococci, in many cases, the wider the variety and the greater the gradations of treatment, the better the results."

Electrotherapy succeeds where other methods fail. Its gradations are exact, its reactions are unknown, and, therefore, there are no unfavorable reactions. If the form and intensity of the current, the duration and frequency of the treatment and the after care of the patient, are all carefully selected and carried out, there must be no error in the exact diagnosis of the disease.

Many forms of electrotherapeutics are not universally recognized by urologists while they employ so widely this treatment in the D'Arsonval. This situation undoubtedly arises from the fact that this method of applying the latter two modalities has been neglected.

GONORRHEAL ENDOCERVICITIS

The first phase of the subject to be discussed, in a brief manner, is a consideration of gonorrheal endocervicitis. It is one of the bugbears in the entire curriculum of medicine. I

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know of no condition that is more difficult to eradicate than gonorrheal endocervicitis. The many methods and various medicaments that have been employed year after year are indeed significant that the proper method of treating this condition is yet to be found.

I am indebted to Dr. Corbus of Chicago, and his associate, Dr. O'Connor, for a considerable part of the information I have on this subject. It is not original with me as I have imbibed freely from their contributions to the literature.

It has been definitely proven that heat constitutes an ideal gonococcide. Experiments by various investigators in this country and in continental Europe have proven, conclusively, that the gonorrheal organism cannot withstand high degrees of temperature; and, in accordance with this basic principle, diathermy has been developed as a therapeutic measure to combat the various gonorrheal infections and their complications.

Technique: The technique of treating gonorrheal endocervicitis by the Corbus cervical thermophore is very simple.

First: In the application of the electrode, the inactive electrode is placed over the suprapubic area, the active electrode is inserted in the cervical canal and retained there by packing numerous layers of gauze around the circumference of the thermophore which prevents displacement during the treatment.

Second: A thermometer is inserted in the interior of the active electrode and proper connections are made with the diathermy machine.

Third: The current is gradually turned on until the required degree of heat is registered on the thermometer, which usually is in the neighborhood of 46.5 to 47 degrees C. The length of treatment is from forty minutes to an hour.

Fourth: If the treatment is properly given, there should be no unusual disturbance. Patients often go to sleep during the treatment which is significant of the soothing effects of heat.

Fifth: These treatments are given at intervals of from seven to ten days, and the number of treatments required ranges from three to ten.

Sixth: In the intervals of treatment, the patients are ordered to purchase a water bath vaginal speculum and instructed in its use.

After each treatment cervical smears are made at repeated intervals for search of the gonococci. After a complete subsidence of the discharge, provocative applications of nitrate of silver are made to the cervical canal, and further cervical smears are obtained for bacteriological study. If after this regime the smears are negative, the patient is considered cured but is kept under observation to determine the permanency of the cure.

Contra-Indications: Contra-indications to the employment of the Corbus cervical thermophore are: (1), early acute stage of gonorrheal endocervicitis; (2), active inflammatory condition of the Fallopian tubes; (3), pregnancy.

Efficacy: As to the efficacy of this procedure in the treatment of gonorrheal endocervicitis, my observations during the last year have conclusively proven that this method surpasses and excels any other methods that have been in vogue, heretofore.

GONORRHEAL URETHRITIS

I have not alluded to diathermy in the treatment of gonorrheal urethritis in the male, particularly because the literature on this subject, and the information that I have obtained by personal communication from some of the investigators, convinced me that this treatment is not successful. In the treatment of the various complications of gonorrhea in the male, however, the converse is true.

GONORRHEAL EPIDIDYMITIS

You are all aware and are conversant with the usual method of treating gonorrheal epididymitis—to elaborate on it here would be simply reiteration. For a good many years, I have performed a great many epididymotomies in those cases that did not yield to the usual conservative therapy. My result with this operative procedure has been exceedingly good and I have never regretted its adoption; however, there does exist some disadvantage to operative procedures in that the patient is compelled to go to the hospital for at least a week or ten days which necessitates often being away from work, and there are many whose finances are such that hospitalization cannot be carried out.

Diathermy in the treatment of gonorrheal epididymitis, carried out by means of the Corbus scrotal clamp, has been unusually successful. During the past year I have not been compelled to resort to any operative procedures for the relief of this condition. I have found that diathermy is, practically, a specific weapon. It relieves the pain as instantly as an epididymotomy, reduces the swelling as effectively as the former, and, in addition has the added advantage that it does not compel the patient to be laid up or absent from his usual routine work.

Technique: The technique of the application of this diathermy scrotal clamp is not very elaborate. It is constructed so that the testicle and the epididymis are enclosed between two concave discs which are self adjusting in order that they may be applied to the variation in size of scrotal contents. Each disc is connected to binding post in order that a bi-polar current may be utilized. When all connections are properly made, the current is turned on gradually and increased to a point where the patient complains of a definite discomfort; the current is then gradually reduced to where the sensation of discomfort becomes less noticeable, and the treatment is continued for a period of forty minutes or an hour. Usually from three to four applications are sufficient to bring about speedy resolution in the course of the disease.

GONORRHEAL PROSTATITIS

In the management of gonorrheal prostatitis by diathermy my experience has been limited. It is only within the last four months that I have utilized this mode of therapy. I have been employing a prostatic electrode which has been developed by Dr. Corbus.

Technique: The indifferent electrode is placed in the suprapubic region just above the symphsis pubis, the active electrode is inserted into the rectum so that it is in proper contact with the prostate. The current is gradually turned on until the patient complains of a certain degree of discomfort; it is then reduced to the point of comfortable toleration, which is maintained for a period of twenty minutes. I follow these treatments with the usual prostatic massage. The amount of secretion, both prostatic and vesicular, obtained following such procedure is far greater than when the usual massage alone is given. I am convinced that dia-

thermy will be developed as a potent adjunct in the treatment of this condition; however, it is yet too early to make definite assertions regarding it.

SURGICAL CONDITIONS

Before considering the application of diathermy in some of the surgical conditions of the urological tract, permit me to quote a paragraph from Dr. Howard Kelley as it appeared in one of our journals:

"Surgery is the most aggressive procedure and the only one associated with serious risk. The limitations of surgery are at present, as in the past, due to the fact, with rare exceptions, that it is only applicable to isolated, pedunculated growth—the simplest growth under discussion—while it is worse than useless in carcinoma invading the bladder wall. It is difficult to see what field will remain for the pure surgeon to employ his art except as an adjunct to radium or endothermy. We have felt a serious temptation to spend considerable time in developing another form of surgery. It is quite certain any attempt to remove a tumor by means of forcep or knife is exposed to risk of serious hemorrhage and should be eliminated."

It is evident from the foregoing paragraph, that surgery in itself has been a dismal failure in the treatment of neoplasms of the bladder. During the past five years considerable work, both experimental and clinical, has been consummated with the employment of surgical diathermy or electrocoagulation in the therapy of bladder tumors.

Luys and Doyen in France, together with Clark, Kolischer and Corbus in America, have demonstrated conclusively the advantages of electrocoagulation over surgery in the treatment of bladder tumors. The impetus given to this particular mode of therapy has stimulated others, with the result that many urologists are now adopting this method of treatment to the exclusion of others.

Technique: Application of technique with surgical diathermy in the treatment of bladder tumors consists of: (1), Anesthetization is required. Sacral anesthesia combined with abdominal field block is to be preferred because the various general anesthetics, if used, must be employed with great caution, due to the fact that short circuiting might occur which ofttimes results in serious burns to the patients. (2), The usual suprapubic incision is made, the bladder properly exposed, self-retaining tractors are inserted and a careful inspection is made to determine the character of the growth, and, particularly, its location. The method of application of diathermy, in a great measure, depends on this location. If one is confronted with a pedunculated, single growth, this can best be removed by resecting the tumor by means of the electrocoagulating knife followed by coagulation of the base with a small, flat circular electrode. If, however, we are contending with multiple sessile forms of growth, it is best to carry out the electrocoagulation with various sized button-shaped electrodes. The important fact to be constantly kept in mind in the technique of this process is to produce a slow thermopenetration, for slow infusion of heat produces a more thorough cooking of the tissue and prevents such complication as perforation of the rectum.

Advantages: The advantages of this method are many:

First: There is no shock, because the operation is not time consuming and tissues are traumatized very little.

Second: It is practically a bloodless affair if the proper type of electrode is employed.

Third: The dangers of metastases are minimized, because the tissues adjacent to the growth are partially coagulated, with the result that cell implantation is avoided.

Fourth: This procedure lends itself best to regional anesthesia, which avoids resort to the usual inhalation anesthetics.

In the past year and a half, I have treated three patients who had definite bladder tumors by means of surgical diathermy. These patients still are under observation and repeated observations with the cystoscope and x ray have failed to show any evidence of recurrence up to the present time.

I am sure that the time is not far distant when the scalpel for excision of tumors of the bladders will be obsolete, and that we have in surgical diathermy a formidable weapon which will entirely displace the use of the knife for this particular condition.

There are many other conditions of the genito-urinary tract that yield admirably well to surgical diathermy aside from tumors of the bladder. Tumors of the urethra, both in the male and female, can be eradicated more efficiently with surgical diathermy than with any other method known. I would advise more frequent resort to this method for this pathological entity. Lesions of the external genitalia also offer a field in which surgical diathermy exerts beneficial influences. It is surprising to observe in chancroidal infections what diathermy will accomplish when other measures fail. It is practically a specific for chancroids. In suppurative inguinal adenitis, this method of treatment will assist in bringing about an earlier resolution of the process, thereby shortening considerably the time the patient is incapacitated.

CONCLUSION

In conclusion, permit me to emphasize that the genito-urinary tract offers a fertile field for the application of this mode of physical therapy, always having in mind that diathermy does not supplant the other well known standard therapeutic measures, but it is employed as an accessory.

To the pioneers in this field of work, a perennial debt of gratitude is due because it is through their efforts that the profession of today is reaping the fruits of their endeavor. I would offer a word of admonition to those of the profession who have not utilized this particular therapeutic procedure, namely: not to speak disparagingly of this physical measure in the treatment of the various diseases until at least a reasonable trial has been given.

DISCUSSION

Q. I would like to ask as to the treatment of chronic prostatitis with diathermy.

A. I do not employ surgical diathermy in the treatment of chronic prostatitis. I employ a bi-polar current. The inactive electrode is placed just above the symphysis and the active electrode is placed in the rectum in direct contact with the prostate. The usual technique is employed. The active electrode is connected and the current is gradually turned on until the patient complains of a slight degree of discomfort. From 300 to 500 milliamperes is given. The treatment lasts twenty minutes, and is repeated at intervals of from seven to ten days. A microscopic examination of the se-

cretion, expressed by the massage, is made and cultured.

Q. Why cannot gonorrhea in the male be treated with diathermy as well as in the female?

A. There is something about the vascularity of the male urethra that makes diathermy not feasible. Most investigators on this subject are of this opinion.

Q. Did you ever use diathermy in the treatment of prostatic hypertrophy?

A. I have never employed diathermy in the treatment of prostatic hypertrophy.

Q. What result have you had with diathermy in the treatment of cystitis?

A. I have never employed diathermy in the treatment of cystitis. Cystitis is usually a manifestation of some other condition and, until a correct diagnosis is obtained, the proper therapy cannot be instituted.

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Internal Application of Heat by Means of Electric Currents*

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THE beneficial effects of heat for certain types of cases has long been recognized by the medical profession. With the coming of electricity, heating pads became available, the heat being caused by the current flowing through a resistance, and the pad was applied as nearly as possible to the portion of the body to be heated. The principle involved here is no different from that of salt bags, hot towels, etc. Then the question was raised, why not let the currents flow through the flesh itself, and thereby apply the heat directly to the point desired, especially when this point is deeply imbedded? Two questions are involved in this: can a type of current be used which is safe? and, how can this current be controlled?

The danger, when electric currents pass through the body, lies in electrolysis, i. e., electrical decomposition. By using alternating currents this is minimized, especially when using very high frequencies of the order of 30,000 cycles or over, per second. This gives a radio frequency —wave length 10,000 meters or under; hence a radio frequency generator of some sort must be used as a source.

To cause the currents to flow through a given part of the body, metal plates (electrodes) are applied to the surfaces between which the given part lies. To determine methods of control of the currents, we may start by determining the flow in the simplest type of circuit electrically, to a uniform mass of material lying between two electrodes. In such a circuit, heating will be greatest where the current densities are greatest, and lowest where the current densities are lowest. By determining the paths of the currents and thereby the points of greatest current density, the points of greatest heating are thereby found.

The direction of the flow of currents between metal plates is shown in Figure 1. Near the center of the plate the flow is straight across (A), while nearer the ends, due to the fact that the electronic repulsion from one side is greater than from the other, the paths curve outwards along the edges, (B and C).

HEATING IN UNIFORM MASSES

If we could draw these current paths accurately the numerical value of their densities squared would be a comparative measure of the heating. If the amount of heating could be shown by the darkness of the shading, the resulting heat distribution could be graphically illustrated, as shown in Figure 2. However, results of a research published previously indicated heating such as shown in Figure 3, differing in that the center of the mass between the electrodes was hotter than the parts surrounding it. This apparent contradiction of fundamental theory was called to our attention by Dr. Miles J. Breuer of

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Lincoln, Nebraska, and an investigation of our own was carried on at Purdue University by Messrs. J. F. Hirlinger, L. O. Brown and E. H. Erickson, and was completed in June, 1924, in connection with their baccalaureate theses.

Metal plates were used as electrodes, in a box 5 inches by 6 inches by 3 inches filled with wet clay to which salt had been added to facilitate the current's flow. The temperature rise was determined for each square inch by a thermometer which was readable to 0.1° F. A thirty thousand cycle "continuous wave" electric current was used, generated by the so-called Hartley circuit, using a radio transmission tube, such as is used as a generator by broadcasting stations.

In nearly every case the results shown corresponded to those illustrated by Figure 2, the intensity of heat being greatest adjacent to the plate electrodes, gradually and evenly diminishing as we approach the center and advance towards the outer sides. Only a very few tests showed greater heating at the center than in the adjacent space and then to only a slight degree.

HEATING IN NONUNIFORM MASSES

So far we have discussed only the flow in masses which have the same electrical resistance throughout: a condition which no considerable mass of flesh can satisfy. In a nonuniform mass, that portion of the mass having the lowest resistance will often heat the most. Since the reason for this lies in a fact which is very often overlooked, it should be especially noted here. In a resistance circuit, such as we are considering, the rate of heating depends upon the watts expended in the circuit, which we may determine quantitatively as follows: If we let

E = volts, I = amperes, W = watts, R = resistance (or ohms)

$$W = EI \quad \ldots\ldots (1)$$

By Ohm's law: $I = \frac{E}{R}$, or $E = IR$

And hence, $$W = \frac{E^2}{R} \quad \ldots\ldots (2)$$

or: $$W = I^2R \quad \ldots\ldots (3)$$

Whether we use equation two or three depends upon the circumstances with which we are dealing. If we are comparing two parallel circuits, the voltage across each is the same: so, for convenience, we will use equation two which tells us, since the voltages are the same, that the watts, and therefore the heating, is the greatest where the resistance is the lowest. This is true only where we are comparing two paths reaching from plate to plate as in the case under discussion. The circuits are arranged in parallel: and, if we can find the path of least resistance between the plates, we will have found the path of greatest heating.

On the other hand, in comparing successive layers between the plates and parallel to them, we have the layers in series, for all the current going through one layer goes through the one next to it. Since the voltage across various layers of nonuniform substance will be different and hard to determine, it becomes more convenient to compare the energy, or heating, by using the formula, $W = I^2R$. This tells us that if two layers have the same current through them, the one having the greater resistance will have generated in it the greater heat.

Before we can answer the question as to whether lower resistance will mean greater or less heating, therefore, we must know whether the two paths being compared have the same voltage across them, or the same current through them: these being the conditions, respectively, in parallel and in series circuits.

If we place a piece of flesh between two electrodes, the first thing we should expect would be that next to the electrodes there would be a layer of considerable heating, unless we have exceptionally good contact: the contact resistance is in series with the rest of the circuit, and the layer of greatest heating is the layer of highest resistance.

The results which led to the conclusion of Figure 3 may easily have come indirectly from a change of resistance of the tested material, and involved the principles of parallel circuits just mentioned. Such a change, modifying the flow in uniform masses as shown in Figure 1, with the heating as in Figure 2, to allow greater currents to flow in the center, would account for the phenomenon shown by Figure 3. This in turn could be accounted for by a lowering of the resistance of the specimen which was used (beef) as it became heated.

In the tests giving rise to Figure 3 some of the results were shown by the coagulation of the meat, and others by temperature measurements. In either case, the outside is subjected to greater cooling than the inner layers, but not to a great enough degree to account for the effect observed. If, however, the slightly greater heating in the center tended to decrease the resistance through the center, the proportion of the current which will flow through the center will be increased, and a cumulative action will be set up in which each step tends towards greater heating in the center.

The requirement for this is that the heating must decrease the resistance of the specimen under test.

To determine the behavior of beef, a number of samples, both of solid pieces, and ground beef in paper cylinders, were subjected to a resistance test on 60 cycle current. The

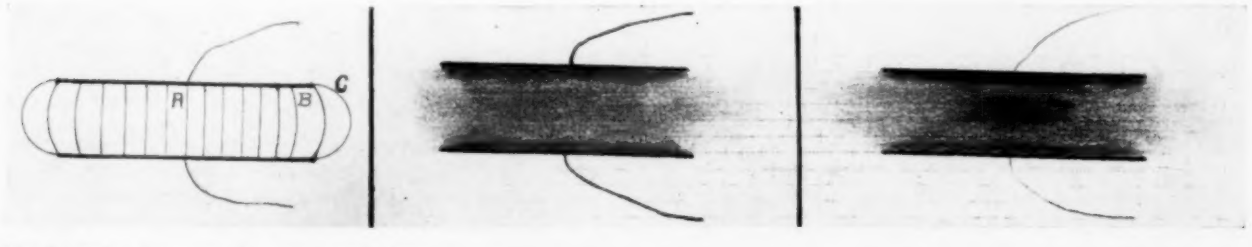

Fig. 1—Flow of currents between metal plates.
Fig. 2—Modern fundamental theory of the heat distribution between two electrodes. Greatest concentration has been considered to have occurred adjacent to the plates, gradually merging into a homogeneous heat in the center.
Fig. 3—Experimental data contradicts this fundamental theory. The heat, great at the border of the plates has been found to be hotter in the center of the mass between the electrodes, than in the surrounding parts.

use of a 60 cycle current is permissible since no attempt was to be made to determine current distribution for this portion of the work, but only the resistance change; resistance not being directly affected by frequency.

It was found that a slight coagulation of the tissues caused a considerable decrease in its resistance. When well coagulated, the resistance had dropped nearly to one-third of its original value in every case. Two tests, chosen at random, are shown in Figure 4. Curve I is for a cylinder of ground meat, whose resistance dropped from 110 ohms, raw, to 40 ohms when cooked. In curve II a smaller, but solid, evenly grained piece was used, the resistance dropping from 28 ohms to 8 ohms as it cooked.

That there was considerable radiation present was demonstrated by the fact that even though the tests were run at high currents (1000 to 5000 milliamperes) and therefore were completed in a very short time, the surfaces were not as well coagulated as the internal portions.

The possibility that the peculiar characteristics shown in Figure 3 may be due to the coagulation is therefore shown. The current when first turned on will be flowing evenly through all portions, as in Figure 1. Due to radiation along all faces of the specimen, the center gets somewhat warmer than the edges:

(1) This decreases the resistance and allows more current to flow in the center,

(2) Which heats the mass in the center more and causes some coagulation,

(3) Which decreases the resistance and allows more current to flow, etc.

This vicious cycle does not affect the heating around the edges if the voltage remains the same as the current increases. In the case of the spark-gap oscillation generator, however, there is a large resistance in series with the test specimen, and the voltage will decrease as the current increases. This will decrease the current around the edges, making the contrast in heating even more pronounced.

This phenomenon shown by Figure 3 is probably due then, to the coagulation of the specimens used, and not to the natural behavior of the electric circuit. This means that the size of the electrode will not be as important as has been thought in the past, as there will be no hot spot, the depth of which is to be controlled by the size of the electrode. The operation of the electric heating device is more simple. The only time that the former results will come into play will be when coagulation will take place, and a doctor should be able to dispose of patients by more humane methods than electrically cooking them.

Using the principles of series and parallel circuits mentioned, and applying them to the human body as a circuit, some general rules may be deduced for the control of the heat:

1. If a high resistance body (bone, fat, etc.) extends from one electrode to the other, surrounded by a low resistance portion (flesh, blood vessels, nerves, etc.) the currents will be slight through the high resistance and the heating will be concentrated in the low resistance path.

2. If a high resistance body extends parallel to the plates and between them, with only a long path of low resistance to avoid it, heating will be concentrated in the high resistance and the low resistance on either side of it will be comparatively cool.

3. Blood vessels will, by circulation, carry away a great deal of heat. When they extend from one electrode toward the other for a considerable portion of the electrical path, there may be heat generated in the blood sufficient to overcome this effect.

4. For uniform masses the heating will occur fairly uniformly between the center of the electrodes, with the superficial structures slightly warmer than the deeper structures.

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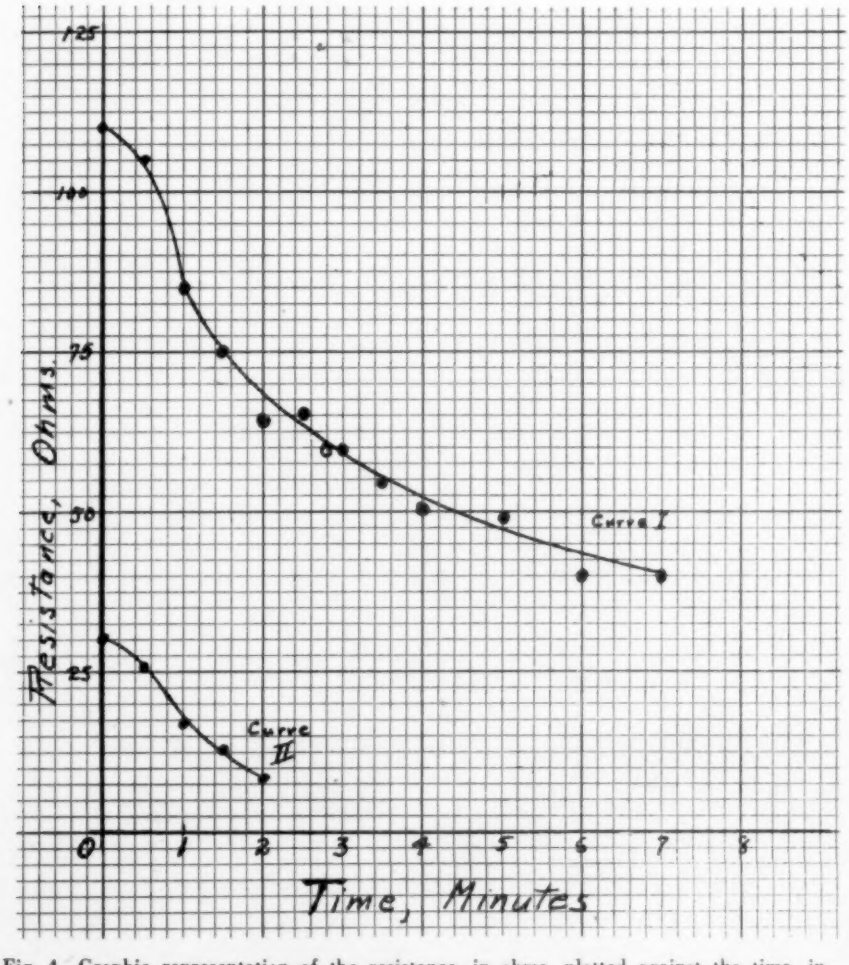

Fig. 4—Graphic representation of the resistance, in ohms, plotted against the time, in minutes. Two tests, chosen at random, show that slight coagulation of tissues caused a marked decrease in resistance.

The X Ray Treatment of Tonsils and Adenoids*

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BY way of introduction, a few words as to why I started the x ray treatment of tonsils and adenoids might be interesting. During the winter of 1920 and 1921, I was treating a patient for a toxic thyroid and I had insisted upon a surgical removal of her tonsils, which she refused to do on account of her age and her general run-down condition.

About this time Dr. W. D. Witherbee of the Rockefeller Institute began reporting on the x ray treatment of tonsils and adenoids. I jokingly remarked to the patient one day of this method and she insisted that I try the same on herself. This was immediately started, but after giving three treatments the patient did not return.

The following October my nephew, a boy of thirteen years, came to our home for a visit. He had been advised by a number of physicians to have his tonsils removed, and circumstances were such that we considered it advisable to remove them during this visit. This was done under ether anaesthesia, and was performed speedily and without difficulty. At the time of operation it was noted that a lower molar on the right side had a few drops of purulent material draining from the lateral border of the tooth. The second day he became morose, despondent, developing a high temperature and complained of an increasing soreness of the throat. He had a firmly fixed idea that he would not recover, but we did not give this serious consideration. It became very difficult to see into his throat, but a dirty membranous sloughing area could be noted on the posterior buccal wall. Cultures, smears and blood cultures were made. Smears from the throat and blood cultures showed the presence of the spirillum of Vincent's Angina. Neosalvarsan, which is almost a specific for this condition, was used without benefit. Large doses of diphtheritic antitoxin were used before a positive diagnosis of Vincent's Angina was made, although the cultures were negative for diphtheria bacilli. It was our firm opinion that this infection had originated around the tooth. The boy became progressively worse, merging into delirium and remaining in this delirious condition for ten days, when death intervened. Every possible effort had been made to save this boy's life, but without avail.

Very soon after this, the patient who had been treated three times for infected and hypertrophied tonsils came to the office to have me see her throat. Her object in coming is best described by her own remark, "Doctor, I do not want you to remove tonsils surgically when you can do the work so well with x ray." To my surprise I found her tonsils almost completely atrophied. Since that time I have treated almost two hundred patients for infected and hypertrophied tonsils and adenoids with the x ray, with a high degree of satisfaction.

Both lymphatic and embryonal tissue are easily influenced by x ray, and since the tonsil is for the most part lymphoid tissue, it is easy to explain this atrophy following treatment. When the tonsil and lymphoid tissue atrophies, the distortion of the crypts is relieved and if carefully watched, after a few treatments, it will be noted that pus and a caseous material exude from them.

The x ray was first used, with universally good success, about the neck many years ago for the treatment of tuberculous glands. It was not observed at that time, but the tonsils in a majority of cases no doubt atrophied under this treatment, producing an unrealized beneficent effect.

The writer, twenty years ago, assisted in the treatment of two sisters suffering from tuberculous glands of the neck, who made a complete recovery. They have been examined recently and were found to be in a fine condition. There was no sign of an enlarged gland and the tonsils were completely atrophied. They report that at no time have they had any sign of a throat infection. The apparatus used at this time was the old fashioned static machine with the small glass tube. Many of such results as those cited above could be given to prove the beneficience of this method of treatment of the tonsils and lymphoid tissue by the x ray.

TECHNIQUE

The technique proposed by Dr. Witherbee is as follows: 7 inch spark gap, 5 milliamperes of current, 10 inch distance and 4 minutes time. Three millimeters aluminum and one millimeter of leather are used for filters. The exposure is repeated every other week and the number of treatments depends upon the progress of the individual patient. It usually requires from six to eight treatments and 12 is about the largest number which it has been necessary to use. A piece of sheet lead with an opening 2 by 2½ inches, is used for protection of the head and face from the focusing rays.

My technique is the same as that given above, except that I use a 10 inch gap with the equivalent of six millimeters of aluminum or one-fourth millimeter of copper and one millimeter of aluminum as a filter.

The technique of placing the patient upon the table is one of the important things, for it is very easy to miss the tonsil when treating through a small opening. The patient lies prone upon the table. The head should be flat and turned to one side. With a child, throw the lead rubber over its feet. Take a piece of adhesive plaster and pull the lobe of the ear over to one side. The upper part of the opening is the upper part of the auditory canal. The ray is centered below the ear at the angle of the jaw. If you will take the head light and look through the ear, having the patient at the same time open his mouth, you will see that the ray hits the tonsil. Drop the shoulder to get away from the tube. The tube is then lowered straight down, and a heavy enough exposure can be used to get both tonsils, but I usually expose both sides. Normal glands are not harmed by radiation.

At each radiation it is well to examine the throat. We usually give a treatment with the tonsil applicator of the water cooled lamp. This lamp gives an excellent light for visualizing the throat. After receiving about two treatments it will be noted that

there is a purulent or caseous material exuding from some of the tonsillar crypts. This can be easily expressed by making gentle pressure with two wooden tongue blades, one behind and one in front of the tonsil.

Occasionally, one or more white or yellow spots will be noted sealed to the surface of the tonsil. The same can be easily punctured with a very sharp, pointed knife. A small drop of purulent material is seen to follow the puncture or adhere to the knife point.

For purposes of comparison the tonsils are divided, as to size, into four groups. In this manner a more accurate record can be kept and the progress of the case can be more closely observed. Recording a normal tonsil as a one plus and a very large tonsil as a four plus, the intervening sizes can be divided accordingly. For example, in watching the progress of a four plus tonsil, in a few weeks' time it will be noticed approaching the three plus size and merging into the two plus size, finally undergoing almost a complete disappearance.

RESULTS

Untoward Results: It has been proven that there is no danger to the lymphatic glands, thyroid, pituitary or any other tissues of the body following x irradiation. Radiothermatitis is a negligible factor, providing the technique is properly carried out.

The only case in which we had untoward results was a lady about 60 years of age who very shortly after the treatment demonstrated an acute swelling of the parotid gland, which subsided after a few hours. The reason given for such a reaction was the length of the treatment, which was longer than ordinarily given in an effort to shorten the number. After this complication we have not used a prolonged treatment and have not had any similar or otherwise regrettable reactions. On this particular complication, Phaler reports one case in 200 will have a swelling of the parotid after radiation about the face and neck. He attributes this to an electrostatic discharge and as remedial measure grounds the lead over the patient's face. Similar conditions have followed the application of radium.

There can be no harm to the thyroid, for it receives no radiation.

Final Result: Witherbee reports 32 cases from a series of 36 of streptococcus infection of the throat relieved four weeks after one treatment. After four to six weeks the tonsil begins to atrophy and reaches the highest degree of improvement at the end of six months. The remaining tissue consists of fibrous tissue and is not productive of harm. There is no damage to the tonsillar pillars and when treatment is completed they are smooth and velvety. The lymphoid islands in the posterior pharynx are also atrophied. Chronic otitis media in children is usually cured.

Diphtheria carriers are cleaned up by this method and 80 per cent are free from diphtheria bacilli in one week after the first treatment. Cultures should be made separately from the nose and throat, and the ear if discharging. If positive cultures are found in either of these places, the treatment is directed accordingly. If positive cultures are obtained from the nose, radiation is directed over the nose; if in the ear, radiation is directed over the ear, and if the throat is infected, the regulation tonsillar treatment is used. Recently I had two cases who had 8 or 10 positive diphtheritic cultures and two days after the first treatment repeatedly negative cultures were made.

There is no pain attached to the treatment, for many of the children will go to sleep on the table. The youngest child treated in our laboratory was two years of age. This patient had a very much obstructed breathing at all times, caused by enlarged tonsils and adenoids. Within two weeks after treatment he was breathing normally and made a good recovery.

Many of my tonsil patients are those who had been advised for many years to have their tonsils removed and had positively refused to have the same done surgically, and are more than satisfied to have the treatment used as previously outlined. The people are willing to be relieved of the unpleasant surgical experience and risk of tonsil removal. Let us help them.

DISCUSSION

Q. What about treating acute tonsilitis?

A. I have never treated acute tonsilitis.

Q. Have you had experience treating little infected masses in the back of the throat—postoperative cases where the tonsils have been removed early?

A. Not that experience exactly, but with this type of patient you can follow the same rule—lymphocytic masses disappear by the time the tonsil is atrophied. You might be disappointed in some cases at the beginning, but be patient. Very often tonsils disappear after treatment has stopped—weeks afterwards—but they keep on improving, sometimes as long as six months after the last treatment. So now I consider it a rule to give eight treatments to each tonsil and tell them not to come back for two months. When they return, you have your result.

Q. Have you been troubled with continuous sore throats after treatment?

A. In my 200 cases I have had one with sore throat, and she had diphtheria.

Q. Would you use the same technique on a child two years old?

A. In a child, atrophy is harder to produce than in an adult. My explanation is that the adult's tonsil is ready to atrophy anyway. In a woman fifty years of age, there was complete disappearance of a big, spongy mass in two treatments.

Q. If atrophy of the tonsil does not occur in children, then what changes do occur in that tonsil?

A. Atrophy of the tonsil does occur in children, but is slower in children than in adults, because the tonsil is more normal and active at that age. That is only my opinion. A person of forty-five or fifty should not have much tonsillar tissue. This type of tonsillar tissue disappears more rapidly unless it is made up entirely of fibrous tissue. Occasionally you will find a tonsil that is only fibrous tissue—just a hard fibrous mass. It is not doing much harm to the patient and is not susceptible to the x ray.

R. W. Fouts, M. D.: Again, if you will remember, the tonsil is essentially a part of child life. You can look at any child's throat and see it protruding. The lymph tissue is not well formed during the first year. Afterwards the function is taken over by the lymphatics, so that the tonsil should atrophy. Consequently an adult's tonsil will respond to the treatment better than a child's. I think that is the reason why you do

not see the result better. In a child they seem to stick out in the throat. If they are not pathologic, by the time that child comes into adolescence they will disappear.

Q. How many treatments do you usually give?

R. W. F. About eight, on an average. I have given twelve.

Q. How close together?

R. W. F. About ten days apart until I have given six. Then it is owing to how the thing is working. If the tonsil is atrophying I will prolong the treatment three weeks: I usually do anyway. Sometimes I have noticed that given every ten days results are not obtained.

Q. It is my experience in scarlet fever that the worse the throat, the worse the case of scarlet fever is going to be. Rarely do we have a case of scarlet fever in a child whose tonsils have been completely and cleanly removed. I am not saying you do not ever have it. It is rare, in my experience. I was wondering if the presence and condition of the child's tonsils isn't going to have much effect upon the child's throat when subjected to a streptococcic infection? I do not know that this has been definitely proven, but I believe that it is through diseased tonsils that the infection of scarlet fever must enter, for we often find this in a little epidemic of scarlet fever. A number of families, where one or two children who have had tonsillectomies, are living under conditions so that they could not be isolated from the patient, and are exposed every day. These children do not have scarlet fever, while those children with tonsillar tissue invariably contract the disease.

Q. In clearing up these focal infections, what results have you had in regard to rheumatism, etc.?

A. L. Yocom, Jr., M. D.: Good.

Q. How long before you get a response?

A. It depends upon the virulence of the infection. Sometimes by the time you are through with the tonsil you will have improvement. I have had them clear up in two weeks' time. I had a lady come in with her ankle markedly edematous and swollen. The top of her foot was extremely puffy putting on pressure. After two weeks' treatment the swelling had subsided. The first noticeable effect in the tonsil is the shortening of the crypts, and the holes begin to open and pus exudes. With the tongue depressor often these white patches can be removed. After this is done results rapidly follow.

Q. In these choked-up youngsters, how soon does respiration become more free and easy?

A. The adenoids seem to respond more quickly than the tonsils. The mother will tell you they breathe better after the first treatment.

Q. Do you use the actinic ray following the x ray exposure?

A. Sometimes, but the actinic ray is of more value in sterilizing the throat.

R. W. Fouts, M. D., Omaha: One of the leading child specialists in Omaha was recently asked in how many cases of adenoids and tonsils, particularly adenoids, that he was satisfied that he had done a complete job. He said, "None. You scrape up what you can, and trust to God the scar tissue will sufficiently protect the rest and won't give any trouble."

To me this treatment is the one *par excellence*. The x ray has a selective action upon this particular kind of tissue. We know it will do the work. We know it will render a diphtheria carrier sterile in a week's time. That has been proven by many men. Whether its action is bactericidal—they say it is not—you can expose the germ to the x ray without any effect, but clinically, the way we determine whether or not a case is a diphtheria carrier is by a culture taken from his throat. When we cannot get a positive culture, we say he is not a carrier. If x ray treatment will make it impossible to get this positive culture, and that is the only basis by which we judge diphtheritic carriers, why isn't it a good treatment?

Many surgeons have us administer preoperative raying for many conditions. Where it has been done, it has been of value. Statistics will show the number of patients who were alive six years after the amputation of the breast for carcinoma, where they had received preoperative raying, was more than three times those who have not received it, in the same class of cases.

Those of you who are in position to use the treatment, try it out. It is a safe procedure. You don't need a big machine to do it—a so-called twenty inch machine is satisfactory, but you can do it with your ordinary nine and three-fourths inch machine. The Withersbee technique is only a seven inch gap. It is a short exposure.

Don't expect results within a week or two. I would not be disappointed if I would not see results in six weeks, but I would expect to see them in six months.

The Present Status of Deep X Ray Therapy*

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By deep x ray therapy we mean 200,000 crest volts. The usual setting is 200,000 crest volts at a 50 cm. distance, using 1 mm. Cu. and 1 mm. Al. as filter. The erythema time using this setting is 600 ma. minutes. Erythema, when applied to x ray dosage, means a distinct reddening of the skin. With our standard setting, 900 ma. minutes is the time limit of skin tolerance with a large portal of entry. This may be followed by superficial blisters in susceptible individuals, but they will heal without necrosis or scarring. The erythema comes on in about a week to ten days following the treatments. Exfoliation of hair accompanies the erythema at about three weeks (except when the 1500 watt deep therapy light or ultraviolet rays are used), and there is usually brownish discoloration of the skin lasting for several months. An erythema of the larynx is indicated by hoarseness; an erythema of the oesophagus is characterized by difficulty in swallowing; an erythema of the stomach and bowels is accompanied by griping and diarrhea, while an erythema of the bladder is indicated by frequent urination. The limit of safety for raying the bowels is about 130 per cent of an erythema dose, but we doubt very much if the stomach should receive over 100 per cent. The brain and eyes will stand as much as the skin; the thyroid is quite tolerant; and the lungs can be subjected to a complete erythema dose. In treating cancers of the stomach and breast we have repeatedly given an erythema dose through the adrenals and kidneys with no evil aftereffects, although many x ray men consider it unsafe to administer such an exposure to the adrenals.

In using the low voltage machines the skin was our chief anxiety, but we have found that we must be even more careful that the inner structures do not receive an injurious dose. In treating the abdomen we expect a slight irritation of the bowels, indicated by a mild diarrhea. On the other hand we look upon bloody stools as an indication of overexposure.

The absorption of x rays follows the exponential law. We determine the percentage delivered 10 cm. in depth, which is one-half the diameter of the average individual, by means of an ionization chamber and water phantoms. With the above setting, using standard transformers and Coolidge tubes, this percentage is 42.5. By plotting the percentages against their logarithms, using two known percentages, we get a straight line. From this line we can readily construct a curve from which we can read the exact percentage of the surface dose delivered at each centimeter in depth.

Size of the Field.	Intensity	Time	Energy
20x20 cm. sq.	100%	100%	600 ma. min.
15x15 cm. sq.	95%	105%	630 ma. min.
10x10 cm. sq.	87%	115%	690 ma. min.
5x 5 cm. sq.	77%	130%	780 ma. min.

Deep x ray therapy is an exact science today. The deep machines are quite durable and accurate, but their deep output should be rechecked by ionization methods or by measuring the effective wave length. The wave length or effective lamda on our machine is .14 Angstrom units for 200,000 volts filtered with 1 mm. copper and 1 mm. aluminum. A machine should be rechecked, if any important changes are made in the machine, when a new tube is used, and from time to time as a laboratory routine.

One must be sure that the setting quoted in the first paragraph is strictly accurate in all details. To begin with, the spark gap, which must be spherical, must be corrected for atmospheric pressure and temperature. With average atmospheric conditions, at the altitude of Denver, a spark produced at 200,000 volts will jump as far as a spark produced at 238,000 volts at sea level. If one were to separate the spheres the same distance as at sea level when measuring 200,000 volts, he would be getting only 167,000 volts. Since the energy varies approximately with the square of the voltage, the energy delivered at 167,000 volts is 30 per cent less than that delivered at 200,000 volts. The energy varies inversely with the square of the distance. An error of two inches in measuring the distance will vary the dose 19 per cent. The erythema time and the depth dose vary with the filter. Using 1 mm. copper and 1 mm. aluminum, with standard conditions, we get a strong erythema in 600 ma. minutes and a depth dose of 42.5 per cent. With 1/3 mm. copper and 1 mm. aluminum we get a strong erythema in 300 ma. minutes and a depth dose of 31 per cent.

The dose varies with the size of the field. Dr. Albert Bachem, in Principles of X Ray and Radium Dosage, gives the following table:

So by careful measurement, we can determine accurately the per cent of an erythema delivered for each centimeter of depth. We believe all cancers should receive an erythema entirely through the growth and through the glandular drainage area, which dose should be repeated in six weeks. If it seems advisable to operate, the best time is two and one-half to three weeks after the first x ray treatment, always followed by the second x ray treatment six weeks after the first. We believe the patient's chance of cure is greatly decreased by operating before treatment, but in cases in which this has been done we believe they should be x rayed within as short a time as possible after operation, and a second treatment followed in six weeks. We believe all suspicious growths should be x rayed regardless of the pathologist's report. We have personally seen four cases within a year that have been reported negative by the pathologist that later have been proven malignant. We do not consider this the fault of the pathologist but, because of its frequent occurrence, we believe it is unsafe to omit thorough x ray treatment in suspected cases.

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Originally, we administered treatments in as short a time as possible. Now we are giving daily only what the patient can stand without severe nausea and vomiting. This nausea and vomiting, due to administration of large doses of x rays, varies with the susceptibility of the individual, the time, the dose, the size of the area treated and the part treated. The average patient will stand the following exposures at 5 ma. without extreme toxemia: (1), epigastric region, area 8 by 10 inches, 25 minutes; (2), chest, from the clavicle to one inch above the umbilicus, including the arm to the elbow and nearly to the opposite nipple, 30 to 40 minutes; (3), head and neck to clavicle, 60 to 75 minutes; and (4), the pelvis, an area 8 by 10 inches, 60 to 90 minutes. These exposures are made on the ventral surface of the body and the average patient will stand twice the time for the same area on the dorsal surface. If the person is hypersensitive to the x ray or if it is necessary to give the dose quickly, it can be done safely by putting the patient to bed after treatments and by giving normal salt solution by the Murphy drip method in amounts as much as the individual can possibly stand. This should be administered for several days. We use the 1500 watt therapy light for ten days or more in all cases where an erythema dose has been administered to skin or viscera, beginning when the treatments are started. This helps to overcome any adverse effects of the rays on the skin, larynx, oesophagus, lungs and bowels.

We believe all malignancies should receive the limit of toleration of the tissues in which they are located and this dose should be repeated in six weeks as above stated. The ovarian dose, sufficient to stop menstruation, as in menorrhagia at the menopause, or bleeding from fibroids, is from 35 to 50 per cent of an erythema administered throughout the pelvis. However, the direct effects of x rays in fibroids causes the tumor to undergo more complete resolution and many cancers are mistakenly diagnosed menorrhagia. Therefore, we administer the so-called cancer or erythema dose in most of these cases. In the leukemias and Hodgkins disease an erythema through the part is absolutely essential to cause complete regression of the growth. In the exophthalmic type of goitre, we require a basal metabolism test. We administer thirty minutes at a treatment once a week until the total time equals an erythema dose. We do not give a second such series without having a recheck on the basal metabolism and a rest of a month between the two series if the condition of the patient is not too urgent. In treating tuberculosis of the glands, bones, joints and fistulas, 30 per cent of a depth dose is sufficient, repeated once a month for three treatments combined with the usual methods of handling such cases.

REPORT OF CASES—EXOPHTHALMIC GOITRE

Miss Mc. E., age 35, was referred to us first in March, 1923, for a gastro-intestinal examination. History of vomiting and diarrhea, (six to ten watery stools daily). Appendix removed five years before. Gastro-intestinal examination was negative, patient was very nervous, reflexes were increased, and a slight enlargement of the thyroid was reported to her doctor. Weight at time of examination, 87 lbs., and height, 67 inches. She was treated with the deep therapy light and diathermic current through the abdomen daily for six weeks and there was an apparent temporary improvement. She was referred to us again in August. Her diarrhea and vomiting had returned, and the pulse was very rapid and irregular. The thyroid had increased in size, the nervousness and reflexes had markedly increased, together with the exophthalmos. She was given a deep x ray treatment over the thyroid area of 208 ma. minutes. Patient was almost in collapse the next day, pulse 150 to 160, not discernible at the wrist, and the feet were badly swollen. On August 23, the same dose was repeated. This time she did not have a very severe reaction and the pulse did not go over 92. She was kept in bed for a week following treatment. The same dose was repeated, and on November 14, a pulse of 84 recorded. In January, February, March and April, she was given 50 ma. minutes every two weeks. In April, she weighed 110½ lbs., a gain of 23½ lbs., which was more than she had weighed for years. Her pulse was 78 to 80 in July and she has had no return of her former symptoms.

TUBERCULAR GLANDS

Miss S. C., age 20. Patient was referred to us for tubercular glands on right side of the neck. She had had them operated on two years ago and again six months after the first operation. Upon examination we found a mass of glands under the right ear about two and one-half inches in diameter, extending down the neck, involving the mediastinum and continuing into the right axillary space. The patient was given a deep x ray treatment of seventy minutes at 5 ma. This was repeated in six weeks. She was to return for further examination and treatment if necessary but she writes that the glands have all disappeared and that she will report later.

TUBERCULOSIS OF THE HIP AND SPINE

J. D., boy, age 11, was referred to us April, 1923. His trouble began at the age of two years; he had had a running sore on the right hip at the age of five. He had been operated on and had worn a cast for several years, but had not worn it for the last two years. The history revealed a vicious cycle. The sore on the hip would heal, then begin to swell. The patient would have chills and fever, and the sore would discharge. This occurred about two or three times a year, the last time the fistula discharged was in February. It was draining at the time the patient came to us. We gave him a deep x ray treatment of 120 ma. minutes, front and back, each over the fistulous area. This dose was repeated June 2, June 25, and September 5, 1923, and again in July, 1924. There has been no pain, fever, chills or discharge since one week after the first treatment and the patient has been gaining in strength ever since.

HODGKIN'S DISEASE

Miss A. K., age 55. Patient first seen by us in April, 1923. She had a swelling on the right side of the neck, which had commenced the early part of December, 1922. She had had a sudden, severe pain in the neck after which she noticed a slight swelling. She lost eighteen pounds in weight in December and began to get very weak. She had her teeth extracted in February. Upon examination, we found the patient very weak, pulse 120, short of breath, anemic, and hemoglobin 80 per cent. She had a marked glandular enlargement on

the right side of the neck, much less on the left side and en enlargement in full erythema dose to both neck and chest, which dose was repeated in six the mediastinum. She was given a weeks. A third dose was given through the mediastinum. The patient is feeling fine at present and no glandular involvement can be seen or felt.

MYELOGENOUS LEUKEMIA

Mrs. F. W., age 46. This patient was referred to us in March, 1924. She had had "flu" about two years previously and had been in bed about a week. She had had chills and fever at that time. After being out of bed for about two weeks she had noticed a lump on the left side, beneath the ribs, about the size of her hand. This grew to about twice that size in a week and she became very short of breath, weak, anemic and lost weight rapidly. Upon examination the spleen measured eleven inches in length by eight inches in breadth below and about four inches in breadth above. It extended beyond the middle line and deep into the pelvis. Blood examination revealed a Hb. 60 per cent, R. B. C's, 2,300,000 and W. B. C's, 386,000, with the typical myelogenous cells. She was given a full erythema dose at our usual setting. Patient began to feel better and gained in strength for awhile, the spleen rapidly decreasing in size. She then developed hemorrhages from all parts of the body, which is usual in extreme types of this disease and laid for weeks in a comatose condition. She then rallied, her hemorrhages stopped and she became strong enough to go to Missouri for a visit, where she is at present. She writes that she cannot feel the spleen, has gained twelve pounds in weight and is getting stronger.

MENORRHAGIA

Mrs. M., age 49, referred to us in July, 1923. She gave a history of excessive and irregular bleeding for the last year, with watery discharge, no odor and no pain. She had had several severe hemorrhages and was very anemic. The uterus was about twice the normal size, and the cervix was normal. There was no apparent cause for the bleeding. She was given a full erythema dose, as this type of uterus is often indicative of a beginning cancer. When last heard from, she wrote that she had had no further bleeding and had regained her health and strength.

FIBROID

Mrs. C., age 45. Patient was first seen in October, 1923. She had had very severe hemorrhages and was bleeding at the time we examined her. The uterus was the size of a medium sized grape fruit, and the hemoglobin was 60 per cent. She was given a 50 per cent erythema dose, delivered in two days. The first period after treatment was very profuse, the second moderate, and there has been no further flow. She has been examined at three different times since and the uterus is practically normal. She says she is feeling fine.

SARCOMA OF THE ANTRUM

Mrs. P. M., age 61. She gave the following history when referred to us in August. She had had her teeth extracted during September, 1922. Three months after, she noticed she could not breathe freely through the right side of her nose. The roof of her mouth and her upper gum were too sore to allow her to wear her plate. In June, her doctor started to remove the enlarged turbinates and found a malignant growth. She was given three radium treatments and low voltage x ray treatments every two weeks, ten minutes at a time, for six months. When we first saw her, there was bulging of the right eye, nose, antrum, gum and roof of the mouth, the nose lying over on the left cheek. We believed this to be a sarcoma. We gave her a deep x ray treatment of 900 ma. minutes over the entire area. There was no injury to the eye and the growth was practically gone in two weeks. As she said, "People used to stare at me as if I were a monster, now no one notices me."

CARCINOMA OF THE ANTRUM, ETHMOIDAL CELLS AND ORBIT

Mrs. S. R., age 53. Patient was referred to us in June, 1923. She gave a history of having had the "flu" in the winter of 1921. She had had frontal sinus trouble at that time with a bloody, blackish discharge from the right nostril. In January, 1922, she began to have catarrhal trouble of the right side of the nose, the right eye watered and she could not open it as wide as the other one. She began to have neuralgic pains over the right eye, and in October, 1922, this eye began to pain. Bulging of the eye occurred about a month later and she reported to her doctor in March, 1923. Upon trying to remove a growth from the right side of the nose, he found the growth adherent. A diagnosis of adenocarcinoma of the right orbit with glandular involvement beneath the chin, was made and the patient given four or five radium treatments. The patient said that she had been seeing double since the operation, with watering of both eyes and severe pain. She was given a deep x ray treatment of 660 ma. minutes over the right eye, antrum and neck, 540 ma. minutes over the chest, both front and back, followed by vigorous deep therapy and ultraviolet lights. In August, 1923, the patient was again examined; she felt better and had less pain. The growth was about the same as before and she was still seeing double. She was again given 660 ma. minutes over the right orbit, antrum and lower part of the face. The surgeon in charge wished to remove a part of the frontal bone, the anterior and posterior ethmoidal cells and to apply the actual cautery, so that it was deemed advisable to remove the eye. This was done, after which she was again given a full dose over the right side of her face. When last seen she appeared to be well and is regaining her weight.

EPITHELIOMA OF THE CHEEK

Mr. A. F., age 63, was referred February, 1924. Patient said he had had a ring worm or dry scales on the left cheek last July, after which a large pimple began to form, gradually enlarging and becoming horny on top. He tried to remove it with acetic acid; he had no pain but it began to itch. The growth was removed surgically nine days before we saw him. The wound healed nicely but the scar became indurated and a gland could be felt under the left jaw. The pathologist reported epithelioma with projections extending to the edge of the growth. He was given a full erythema dose over the entire left side of the face and neck and the same dose was repeated in six weeks. When last seen there was no induration or trace of previous trouble.

CARCINOMA OF THE LIP

R. W., age 40, was first seen September, 1923. He had had an injury to the mouth about two years ago, after which he noticed a growth on the right side of the lower lip. This began to discharge serum, would

heal over, then break down again. The growth was burned out in March of this year. When we first saw him, the growth extended a little past the middle line of right side of lip. This growth had been there for about seven weeks and there were some palpable glands beneath the jaw in the middle line. He was given a full erythema dose over the right side of the face and neck with an additional dose over the chin and lip in the middle line. This dose was repeated in six weeks. When last examined there was no trace of growth in lip or jaw, nor could any enlarged glands be felt.

CARCINOMA OF THE PAROTID GLAND

C. J. R., age 74. This patient was bitten by an insect in June, 1922, in front of the right ear. The bite produced a running sore that would not heal and was accompanied by very little if any pain. He was seen by his doctor in November, 1922, who found a small sized lump below the ear. This was lanced but no pus was found. He was given eighteen hours radium (amount unknown). The lump became smaller but did not disappear entirely. He received fourteen hours radium (amount unknown) in June, 1923. There was no change in the growth but he suffered a great deal of pain. When examined by us in October, we found an area of induration below the right ear about two and one-half inches in diameter and discharging pus. The posterior cervical glands were palpable. He was given a deep x ray treatment of 908 ma. minutes over the growth, which was followed by light treatments. The pain was very intense. He returned the latter part of November and the same dose was repeated. He would not wait for the light treatments although he was suffering intensely. At this time the growth had nearly disappeared and since then his doctor has written that he thinks the patient is entirely well.

CARCINOMAS OF THE OESOPHAGUS

Mr. E. S., age 54, was referred to us in March, 1923. He gave a history of a dull pain behind the sternum for a year, increasing greatly for the last month and never free from pain day or night. He was unable to swallow except with voluntary effort and would spit up mouthfuls of food for some time after a meal. The x ray examination showed a narrowing of the oesophagus at its junction with the stomach. He was given a deep x ray treatment of 600 ma. minutes, both front and back. There was no pain after the first treatment and although he was very weak for six weeks following the treatment he has gradually regained his strength and seventeen pounds in weight and has had no further trouble to date.

CARCINOMA OF THE BREAST

Miss E. C., age 35, was referred to us for treatment July, 1923. She had noticed a lump in her left breast for three months. Upon examination a tumor mass about two and one-half inches long, by two inches wide, by one and one-half inches thick was found extending upward and outward from the nipple. One large gland was felt in the left axilla. She was given a deep x ray treatment of a 90 per cent depth dose over the front and back of the chest and 100 per cent dose over the left side of the neck, followed by the deep therapy light. The tumor mass and gland became smaller and in the early part of August, 1923, a radical operation was performed. The pathologist reported carcinoma. In September she was given an erythema dose over the front and back of the chest as well as the neck. When examined two weeks ago patient appeared clinically well.

CARCINOMA OF THE STOMACH

Mrs. S., age 71, was referred to us during November, 1923. The patient gave a history of "indigestion" for a number of years. The present trouble began in May, 1923. She vomited after each meal, suffered intensely from pain in the stomach and had been losing weight rapidly. Upon examination a tumor mass could be felt near the middle line in the upper right quadrant. Gastro-intestinal examination showed a filling defect at the pyloric end of the stomach, diagnosed as a probable carcinoma, with practically no food leaving the stomach at the end of six hours. She was given three erythema doses of x ray, front and back, each over the stomach area, six weeks apart. She has had no further pain or vomiting after the first dose was completed. She gained eleven pounds in weight by April; and, when we examined her several weeks ago, she said that she was able to eat anything she wanted, had had no pain nor distress and was feeling good.

CARCINOMA OF THE UTERUS

Mrs. K., age 35. Patient was referred to us July, 1923. The uterus was about twice the normal size, very tender and painful on palpation. The vaginal vault was filled with an ulcerating mass which bled freely. The patient had had a thin watery discharge for a year, and had had several severe hemorrhages. Radium had been applied to the cervix in June, 1923. The patient was very anemic and cachectic. The pathologist reported squamous cell epithelioma of the cervix. She was given a full erythema dose in July and a 50 per cent dose in September. When last examined a few days ago, she was free from pain, had no discharge or bleeding, and appeared perfectly well.

CONCLUSION

1. From the results obtained with deep x ray therapy, no patient suffering with malignancy can be considered properly treated unless deep x ray therapy has been properly administered.

2. In the leukemias and Hodgkins disease, radiation gives the best hopes for the amelioration of the symptoms.

3. In exophthalmic goitres the results are excellent.

4. It is a wonderful aid in treating tuberculosis of the glands, bones, joints and tuberculous fistulas when combined with the usual methods of handling such cases.

5. About 50 per cent of fibroids should be treated with x ray in preference to surgery. In the treatment of fibroids, when the cases are properly chosen, the results are satisfactory in 95 per cent of the cases.

NEW EQUIPMENT

Recommendations for Handling and Storing X Ray Films*

EASTMAN KODAK COMPANY,
Rochester, N. Y.

GENERAL SUGGESTIONS

(1) In all rooms where x ray films are stocked, handled or filed, smoking should be strictly prohibited and conspicuous "NO SMOKING" signs posted.

(2) A metal can (preferably with spring hinged cover) should be provided for all waste negatives and film scrap, and at no time should these be permitted to accumulate and lie around on tables, benches or floor.

(3) It is best, both for the matter of freshness of films and reducing fire hazards, that the stock of unexposed films should be kept at a minimum—the actual quantity depending on the ease of receiving fresh supplies from the dealer or distributor. Such stock should be kept in a cool, dry place out of the way of ordinary room traffic, in a metal box or can. A lead lined metal box or can is suggested, as this also prevents damage by x rays.

(4) In rooms where films are filed or handled, there should be no flames or any other than standard electrical fixtures. All open lamp bulbs should be protected from breakage by suitable guards. A hand fire extinguisher should be in each room where films are handled. Any of the standard, approved, portable 2½ gallon extinguishers will be satisfactory. Darkroom and other doors should be arranged so as to make egress from such rooms easy. It is desirable, if possible, to also have such rooms protected by automatic sprinklers.

(5) Film negatives should be filed as soon as possible in heavy manila envelopes, either singly or by case, and the filing of these so arranged that it is convenient from time to time to weed out useless negatives. The storage of film negatives in bulk without enclosure should be prohibited, and in all places where films are handled or stored there should be no storage of other inflammable materials and no litter or accumulation of waste paper.

(6) Illuminators should be so designed that the diffusing glass is not hot to the touch and there should be no unnecessary display of film negatives in lighted illuminators. Negatives set up for viewing should be confined to those actually being inspected.

(7) If it is necessary to keep an active file of films for a current period of about a week in the actual x ray room, these should be kept in a metal container. Such a file should be limited to about 50 pounds of films.

(8) Films should not be stored in the basement of any establishment.

SUGGESTIONS FOR FILING BULK STOCK OF FILM NEGATIVES

(1) Where it is necessary to keep the accumulated results of x ray examinations for a period of months or years, it is obviously necessary to take certain further precautions to reduce fire hazard. In the case of hospitals, where it is usually possible to secure additional space for such a purpose, a suitable room should be set aside for an exclusive and permanent bulk file of all x ray negatives. Such a room should preferably be located at the top of the building and be of fire resistive construction. Most modern hospitals have small rooms which could be made into virtually fireproof vaults by a few simple changes. There are only four basic requirements that should be satisfied:

1. The room should be of fire resistive construction.

2. The room must have a direct outlet to the outer air.

3. There should be a class B, self closing fire door at communication to building proper.

4. The room should be additionally protected by automatic sprinkler heads operated from an adequate water supply.

As regards the vent opening in the room:—this may be kept covered against the weather by glass or metal, but if such a protective device is used it should be arranged in a sash or so hinged as to open automatically in case of fire. This can be very easily arranged. If the room is not located on the top floor it is desirable in most cases to run a metal vent pipe from the outlet to the roof. The exact size of the vent depends upon the number of pounds of negatives stored and can be determined from the basic requirements that for each 1,000 pounds of film stock there should be 140 square inches of vent. Thus—

1. A circular opening of 13½ inches diameter for 1,000 pounds.

2. A circular opening of 9½ inches diameter for 500 pounds.

3. A circular opening of 6¾ inches diameter for 250 pounds.

As a guide in figuring poundage of stock the following table is useful:

1. 1,000—14 by 17 negatives weigh approximately 118 pounds.

2. 1,000—10 by 12 negatives weigh approximately 60 pounds.

3. 1,000—8 by 10 negatives weigh approximately 40 pounds.

(Other sizes in proportion to area.)

Relative to sprinkler protection—if there is no existing independent sprinkler water supply available, it will in a great many cases be acceptable to attach the film room sprinkler to the existing house water supply. There are, of course, standard specifications covering the necessary sizes of pipes, etc., for water supply to sprinklers, and the advice of someone in touch with requirements along this line should be obtained.

Where structural changes are necessary, or if it is desirable to partition off a small part of an existing room—the partition can be most satisfactorily made by using expanded metal lathing on wooden 2 by 4's.

*Received for publication March 6, 1924.

There should be about ¾ inch of good grade cement plaster on the metal lathing, and it will, of course, make a more satisfactory looking room and add to heat insulation by putting this plastered lathing on both the inside and outside of the room. If it is necessary to build a fire resistive ceiling or floor, the same general type of construction will be satisfactory in most cases.

(2) In case such a room is not available and the quantity of films does not exceed a reasonable amount, reduction of the fire hazard is assured by the use of proper metal cabinets. These cabinets should be heat insulated metal safes and be vented to the outside by metal pipes. Suitable safes of this type are available. The quantity of films which can be stored in such a manner is limited to 500 pounds in one safe and 1,000 pounds in two safes in any one room. If reduction of fire hazard only is desired, this type of safe will be generally suitable, but if it is also desirable to save as many negatives as possible in case of a fire, the addition of a suitable sprinkler head in the top of the cabinet is necessary. If a safe containing more than 250 pounds of films is used, it should be divided into two compartments, each separately vented. In case of a fire and the flooding of the contents from the sprinkler head, it is possible afterwards to reclaim most of the negatives which are merely wet by soaking them in water as soon as possible. The sprinkler protected safe is the preferable system. In these safes, and also in the virtually fireproof rooms previously mentioned, any convenient filing arrangement of films in envelopes may be used.

These suggestions have been carried out by a number of users of x ray films with excellent experience both as to the matter of safety of negatives and relations with underwriter bodies, and the attendant cost has not been excessive, especially when considering the efficiency of films as radiographic records both in buying and handling.

As regards old negatives which are no longer necessary, and film scrap—these have a salvage value, this at the present time being 17 cents per pound. Such films should be returned to us at Rochester and the amount of salvage will be promptly forwarded. There are certain shipping conditions necessary to comply with and we will be glad to forward particulars to anyone interested.

As regards special needs of any particular hospital or x ray laboratory in the matter of film storage —we will be glad to give specific assistance in each case if details of the conditions and number of negatives made in a given time are sent to us at Rochester.

It is strongly urged that these recommendations be adopted as fully as possible, for x ray films, thus properly considered and handled, present very little risk, and it is the desire of this company to co-operate in every possible way in eliminating any danger at all to hospitals in their use of such films. These suggestions are not to be construed as applying to films in other establishments where the general considerations of use and environment are substantially different from those applying to hospitals.

Copper Which Bends Only One Way*

GENERAL ELECTRIC CO.,

Schenectady, N. Y.

COPPER bars that can be bent double with one finger, but which require strength to straighten again, are expected to lead to a greater understanding of the properties of metals. The bars, which are really single crystals of pure copper, were produced in the Research Laboratory of the General Electric Company, at Schenectady, N. Y., and have been subjected to many kinds of examinations, with the revelation of numerous unexpected facts.

Knowledge about the properties of metals has been limited in the past to observations of masses of small crystals. The usual piece of metal is a conglomeration of small, closely packed crystals, with the crystalline structure usually apparent at a glance. Zinc, for instance, is known as a brittle metal; a rod of it can be bent but slightly without snapping. Yet investigations of small, single zinc crystals show that any one crystal of the metal can be drawn out to six times its length in one direction, while in any other direction it is extremely brittle. The properties of zinc depend upon the examination of the crystal — whether with the grain or against it. The usual piece of zinc is really a collection of small crystals pointing in all directions, so that the properties are the combined qualities of the small crystals in the different axial directions. The same holds true for other metals and other substances.

A single crystal of copper seven-eighths of an inch in diameter and six inches long, as well as numerous smaller crystals of the same metal, have been produced by Dr. Wheeler P. Davey of the Research Laboratory. These crystals, obtained by a modification of the method devised by Dr. P. W. Bridgman of Harvard University, are much larger than any previously recorded.

Very gradual heating and cooling of pure copper in an electric furnace is the secret of the success in producing them. The necessary amount of pure copper, in the form of a bar, was placed in a closed, cylindrical carbon crucible, and slowly passed through the electric furnace. If molten metal is cooled quickly, the resultant mass is composed of very small crystals; if the metal is cooled slowly, the crystals are larger. Dr. Davey cooled the metal so slowly that only one crystal was produced, and that included the entire molten mass. The atoms had plenty of time in which to arrange themselves in such a manner as to build up a single large crystal rather than a multitude of small ones.

Several interesting results have been obtained with the large crystals. A crystal of copper about the size of a lead pencil, if given a jerking

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motion, bends as easily as does a stick of soft wax; it cannot be bent back, however, any more easily than a similar piece of ordinary copper. In each individual crystal of copper the atoms are arranged in columns, equally spaced. When the bar is bent, the spacing is changed; the atoms on the inside curve are pressed together, and those on the outside are spread apart. Strains are set up and the crystal structure is altered. The bar becomes an ordinary piece of copper, of smaller crystals facing in all directions.

If the surface of the large crystal is nicked or dented, the structure in the neighborhood is changed in the same way. It is similarly affected by filing or polishing. When one of the bars is polished it is necessary to take off a mil or less at a time. Even then the structure of the new surface is altered. The condition is remedied by etching away the surface with the usual acid bath.

An etched bar of the copper appears to be rough. There seem to be alternate dark and light lines. The appearance of the lines is due to the fact that the acid etches more easily in some directions than in others. The directions in which it etches with the greatest difficulty are parallel to the axes of the crystal.

Externally, the large, single copper crystals differ little from the usual metal. X ray analysis, however, furnishes conclusive evidence that such a crystal has been produced. Dr. Davey, by means of special apparatus, was able to prove that he had one crystal. In the usual examination, a small tube of finely powdered crystalline material is placed in the path of a narrow beam of x rays of a specified wave length. The substance turns the x rays in different directions, according to the arrangement of the atoms in the minute crystals. A series of lines is produced on a photographic film, and these lines are used in calculations which reveal how the atoms are arranged and how far apart they are. Copper crystallizes in the face-centered cubic system; i. e., the atoms are arranged at the corners of an imaginary cube, with another atom in the center of each face. In studying the single crystal, Dr. Davey revised the method of examination so that the large crystal was used, rather than crystalline powder. The specimen was swung slowly back and forth through an angle of 30 degrees, with the edge in the path of the x rays. The rotation of the single crystal produced the same effect as using a stationary powdered sample, and a pattern was received on a stationary film. At the same time, a moving film was used, mounted on the turntable with the crystal. If the specimen had not been a single crystal, no lines would have been obtained on the movable film, since the x rays would have affected the entire film uniformly. The lines were obtained, however, and calculations based on a comparison of the two negatives showed that the axis of the crystal was parallel with the direction of cooling the ingot.

Fig. 2—Bending one of the crystals with ease.
Fig. 3—Attempting to rebend the bent crystal.

It is difficult to foretell the results which will follow a study of large metal crystals. It has been thought for several years that such specimens would have unexpected properties, and now the prophecy is substantiated.

Fig. 1—Collection of crystals, showing the longest and thickest crystals lying below the ruler.

EDITORIAL

The JOURNAL OF RADIOLOGY

A Journal of Ideas and Ideals.

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A. F. TYLER, M. D.,
Managing Editor

Officers 1925

AT the last annual meeting of the American College of of Radiology and Physiotherapy the following officers were elected for the year 1925:

CURRAN POPE, M. D., Louisville, *President.*

JOHN STANLEY COULTER, M. D., Chicago, *President Elect.*

HARRY EATON STEWART, M. D., New Haven, *First Vice President.*

W. SCOTT KEYTING, M. D., Salt Lake City, *Second Vice President.*

DISRAELI KOBAK, M. D., Chicago, *Third Vice President.*

WARREN B. CHAPMAN, M. D., Carthage, *Fourth Vice President.*

EDWIN C. HENRY, M. D., Omaha, *Treasurer.*

ROY W. FOUTS, M. D., Omaha, *Secretary.*

With men such as these to guide the destinies of the College it cannot fall short of the highest success.

Committees have already been appointed by President Pope and work has already begun so that we hope to be able to report progress in these columns. With a continuation of the phenomenal growth of the past year the meeting at Chicago in 1925 should be the best.

Membership Plans

AT the last annual meeting of the American College of Radiology and Physiotherapy a recommendation was made by the membership committee regarding plans for the year 1925. This committee recommended, among other things, that each member of the College be asked to secure two additional members during the year 1925. This is an easy task, for there can scarcely be one member who does not have two or more colleagues interested in x ray, radium or physiotherapy who would be glad to join the College if the matter were brought to their attention.

Let us all pull together so that this year may be the most notable in the history of the organization. Confidentially, we can tell you that the program committee is planning some wonderful things for the meeting. The program alone will be worth many times the membership dues.

In terms of the Captain bossing an old fashioned house raising in the pioneer days, then Hee! O!!, Boys!, Hee!! O!! and let us put this over big.

Physical Therapy in Universities

THE recent announcement that physiotherapy is to have a prominent place in Columbia University Medical Department shows a growing recognition of this branch of medicine. In the combination of Columbia University and the Presbyterian Hospital, better means are offorded to make a great American Medical center. That physiotherapy will have due recognition and will be properly housed in adequate quarters is a step in the right direction.

Other universities have given recognition to physical therapy in medicine. Among them are Harvard Medical School, University of Chicago, Rush Medical College, and Creighton Medical College.

Physical therapy has a definite place in the practice of medicine as is daily proven by those making intelligent use of it. That American medicine should be so tardy in utilizing it, seems strange. Due to the lack of use of this valuable agent in medicine much help has been inadvertently given various cults closely allied to the medical profession who employ special methods of physical therapy. This form of theory is too often practiced by those having little or no knowledge in anatomy, physiology, pathology and the other fundamental subjects forming the foundation for practical application of the healing art.

As soon as the various medical schools of America give physical methods in medicine their place in the regular curriculum, then the generations of physicians coming on will receive proper instruction in these subjects and will have knowledge of their value in treating the sick.

The College of Radiology and Physiotherapy points with pride to the fact that the leading universities of America have taken this step forward. It is hoped that all other medical schools will soon follow their illustrious example. In this way physical therapy will be put on the proper foundation.

Dentists and Physicians Coöperate

THE Journal of Radiology has frequently called attention to the desirability of closer union between dentists and physicians. The Journal has taken the attitude that close coöperation between the individuals composing the two kindred professions as well as close coöperation between the two professions as a whole would result in better service to humanity. After all, service to humanity is the standard by which the work of these two professions is measured.

Along with the development of this idea in the editorial policy of the Journal, there have been frequent concrete events which have served to strengthen the Journal in its

convictions of the soundness of this policy.

From time to time, other medical and dental journals have called attention to the need of closer coöperative effort between the two professions. Some medical journals have instituted special departments devoted to the discussion of dental subjects.

In other instances, medical societies have given prominent places on the program to the discussion of dental subjects presented by dental surgeons. In every instance these discussions have proven helpful to both professions.

Another step toward closer coöperation of dentists and physicians was recently made by the Philadelphia Academy of Medicine when dentists were admitted to associate membership. Coming, as it does, from one of the oldest and most conservative medical organizations in America, this action has unusual significance. Doubtless many other organizations will follow this worthy example.

In this same connection, it is interesting to note the foresight of the organizers of the American College of Radiology and Physiotherapy in relation to this same question. Those who are familiar with the constitution will recall that it provides for admittance of dental surgeons to membership and when a sufficient number have joined a dental section of the College may be formed. Here then is a great opportunity for the coöperative effort of the two professions to find full and free development.

Radiological Society

THE annual meeting of the Radiological Society held in Kansas City, December 8th-12th, was the best in its history so far as program is concerned. The program was arranged in the form of conferences on various subjects, with one man acting as chairman of each conference.

Among the subjects covered in this manner were:

1. Radiological Education.
2. Bone Tumors.
3. Carcinoma of the Breast.
4. Tuberculosis of the Lungs.
5. Nontuberculous Diseases of the Lungs.
6. Radiodontia.
7. Physics of X Ray Therapy.
8. Cancer of the Uterus.
9. Thyrotoxicosis.
10. Light Therapy.
11. Biology of Cancer.
12. Gallbladder.

Besides these conferences, one day was given over to miscellaneous papers on treatment and diagnosis.

Axel Reyn, M. D., Head Physician of Finsen's Medeciniske Lysinstitut, Copenhagen, Denmark, was the only foreign guest present. Although Dr. Wintz of Erlangen, Germany, had expected to be present, he was unable to do so because of illness.

The symposiums on the various subjects mentioned above were covered from the pathological, surgical and roentgenological viewpoint, which made them well balanced and worth hearing. In fact, the room was filled and many standing at practically every session.

One feature on the program which called forth much applause was the presentation of a motion picture film entitled, "The Roentgen Diagnosis, Classification and Prognosis of Pulmonary Tuberculosis." This film was prepared by Lewis Gregory Cole, M. D., of New York. This film was equally as striking as the one previously made by Dr. Cole on the stomach and duodenum. His classification of the roentgen findings in tuberculosis is clear cut and absolutely sound pathologically and clinically. Closing the film is a series of images showing in about three minutes time, three months progress of tuberculosis in a patient. It is to be hoped that Dr. Cole will soon bring out a motion picture film depicting organic diseases of the stomach and duodenum.

In the conference on bone tumors that snappy little Scotchman, William C. McCarty, gave an excellent theoretical, pathological classification of bone tumors illustrating how bone tumors showing cells with no differentiation were highly malignant, those with beginning cell differentiation were less malignant and those with highly differentiated cells were benign. He urged the adoption of this classification by all pathologists and clinicians so that the present unsatisfactory nomenclature might be simplified and that the character of all bone tumors might be more easily classified.

In the conference on Tuberculosis of the Lungs the outstanding feature was a monograph by William Snow Miller, M. D., Professor of Anatomy, University of Wisconsin. This monograph represented the work of more than thirty years and presented, in an indelible manner, "The Key Points in Lung Structure."

In the conference on Cancer of the Uterus, William Neill, Jr., M. D., presented the results attained in the treatment of cancers of the uterus by radium. His title was, "A Brief Review of the Indications and Technical Procedure Employed in Treatment of Cancer of the Uterine Cervix and Body." Several hundred cases treated were used as a basis showing the technique and results. Wm. T. Bovie, Ph. D., Professor of Biophysics, Harvard University, gave a discussion of "The Relation Between Physiological, Dominant and the Biological Effects of Rays."

At the convocation, gold medals were awarded to Benjamin H. Orndoff and Preston M. Hickey. Honorary diplomas were presented to Axel Reyn and James F. Ewing.

Another Martyr to Pioneer X Ray Work

IN the death of Mr. Ira Simms of New York, August 29, 1924, another early worker with x rays sacrificed his life through devotion to his work. Beginning work at the Roosevelt Hospital in 1900, he later became associated with St. Luke's and the Presbyterian Hospitals. Later he became associated with Dr. F. M. Law and connected with the Manhattan Eye, Ear and Throat Hospital, together with the Woman's and Knickerbocker Hospitals.

In 1907 Mr. Simms lost the terminal phalanx of the left index finger as a result of the action of the rays. Subsequent to this many skin grafts were done on his hands. In February, 1924, the stump of the finger was amputated together with removal of the axillary glands. A phlebitis followed this operation which persisted to the time of his death, which occurred August 29, 1924, due to a thrombus of the coronary artery.

Although Mr. Simms had no medical degree, he possessed a knowledge of roentgen diagnosis that made him a valuable aid. He was a tireless worker. He possessed a sense of humor which concealed the pain which he suf-

fered and a personality which endeared him to all with whom he came in contact.

The American Board of Otolaryngology

THE American Board of Otolaryngology was organized in Chicago on November 10, 1924. The following constitute the board of directors chosen at this meeting: Harris P. Mosher, M. D., Boston, President; Frank R. Spencer, M. D., Boulder, Colo., Vice-President; Hanau W. Loeb, M. D., St. Louis, Secretary and Treasurer; Thomas E. Carmody, M. D., Denver; Joseph C. Beck, M. D., Chicago; Thomas H. Halsted, M. D., Syracuse, N. Y.; Robert C. Lynch, M. D., New Orleans; Burt R. Shurly, M. D., Detroit; Ross H. Skillern, M. D., Philadelphia, and William P. Wherry, M. D., Omaha. The office of the Board is at 1402 South Grand Boulevard, St. Louis, Missouri.

The Board comprises representatives of the five national otolaryngologic associations: The American Otological Society, the American Laryngological Association, the American Laryngological, Rhinological and Otological Society, the American Academy of Ophthalmology and Otolarynogolgy, and the Section of Laryngology, Otology and Rhinology of the American Medical Association.

The object of the association is:

—to elevate the standard of otolaryngology,

—to familiarize the public with its aims and ideals,

—to protect the public against unqualified practitioners,

—to receive applications for examination in otolaryngology,

—to conduct examinations for such applicants,

—to issue certificates of qualification in otolaryngology, and

—to perform such duties as will advance the cause of otolaryngology.

The first examination will be held at the time of the meeting of the American Medical Association.

American Stomatological Association

New York State Society.

You are cordially invited to attend the next monthly meeting to be held on Thursday, February 5th, 1925, 8:30 P. M., at 50 West 88th Street, New York City.

The subject of the evening, "Rhinology in Relation to Stomatology With Special Reference to Chronic Antral Infections," will be delivered by Samuel I. McCullagh, M. D., F. A. C. S. Discussion will follow by Louis A. Coffin, M. D., Edward S. Pope, M. D., and Ferdearle J. Fischer, D. D. S.

Please notify the secretary of your presence at the meeting.

Homer E. Smith, M. D., F. A. C. S., President.
Alfred J. Asgis, Sc. B., D. D. S., Secretary.
Aeolian Hall, 33 W. 42nd St., New York City.

ABSTRACTS and REVIEWS

The Use of Static Modalities—Report of the Committee on Static Currents. WILLIAM D. MCFEE, M. D., Chairman, Am. J. Electroth. & Radiol. 42:369-375, October, 1924.

THE report of the committee is quoted below:

That part of this report for which your chairman is responsible will present only those features of the static current which he has found useful and helpful in the practice of physiotherapy, with special reference to conditions in the treatment of which the use of the static current is considered by him to be the preferred method. This preference, of course, can better be exercised by one whose equipment comprises all types of therapeutic apparatus used in administering treatment by electricity. I will refer particularly to the distinctive value of the static machine in producing mechanical effects on tissue.

Some of the important methods of applying the static current are as follows:

I. *The Static Wave Current.*

A. Over the spine for its general tonic effect.

B. Over the pancreas in the treatment of diabetes.

C. Over the joints for vibratory massage in the treatment of chronic arthritis, synovitis, brusitis and sprains.

D. Over the diseased tissue areas, to dissipate the effects of inflammation and congestion in the treatment of acute and chronic inflammatory conditions (noninfective).

E. Over the abdominal area (in conjunction with diathermia) to stimulate local circulation and increase digestive functions through stimulating the nerve supply, as in the treatment of atonic gastro-intestinal conditions.

F. Rectal application: (1), In apposition with the prostate gland to deplete local congestion by its vibratory massage and exercise effect in the treatment of acute and chronic congestion of the prostate; (2), To relieve congestion and for muscle tonic effect in dysmenorrhea or prolapse of the uterus; (3), In the treatment of hemorrhoids for their depletion (after the acute inflammation has been reduced by the use of diathermy or high frequency nonvacuum electrode).

G. For its nutritional effect on paralyzed muscles, following the regeneration of the nerve supply.

II. *The Brush Discharge.*

A. In the treatment of many skin affections.

B. For the relief of pain, and as an aid in dissipating inflammatory reaction, as in the treatment of simple brusitis and sprains.

C. In the treatment of pulmonary tuberculous abscess.

III. *The Static Spark.*

A. For chronic inflammatory conditions, especially when accompanied by thickening of tissue.

B. In the treatment of chronic arthritis.

C. For restoring muscle tone.

D. In the treatment of sensory nerve paralysis.

E. For relieving and overcoming muscle spasm.

No other form of treatment will accomplish the results obtained by the use of static current for the conditions mentioned. One advantage of the static wave current over other mechanical agents used, is the fact that, in addition to the local action, every application of this current, whenever applied, acts as a general tonic as well. The method of application, however, must be individualized to suit the requirements of the patient, because we must observe different effects with different persons, that is, there is a variable tolerance to time and amount of current used. Patients in a condition of hypertension do not tolerate much of this current, and the effect of treatment on these must be watched carefully and the time element reduced, particularly for the first few treatments. A marked depression is noticed in some patients after treatment has been continued too long. Patients whose temperaments are phlegmatic have a particularly good tolerance to the static wave. The mentally depressed show marked improvement in mental and physical symptoms, being gradually restored to a condition of normal activity.

The time interval of all static currents is an important factor. In the treatment of acute conditions, daily applications, gradually increasing the interval according to the improvement, give the best results. In the chronic conditions, from three days to a week is indicated. Be careful not to overstimulate so as not to exhaust the energy or power of the part treated, or of the patient himself.

In static currents, we have one of the best means at our command to promote the functional activity of the organs that are undergoing degenerative changes. The restoration and increase of functional activity, in all tissues of the body, by means of the metabolic changes which are brought about by the intense vibrations and rapid gymnastic performances of the various static currents, is evidenced by the marked improvement shown in the treatment of many conditions accompanying diseases characterized by a loss of energy, either general or in local areas. The characteristic diffusion effect obtained when using static electricity, especially the wave current, is an extremely valuable therapeutic measure and gives to this current a wide range of usefulness.

Static electricity has certainly demonstrated that it has a distinctive field of usefulness and holds an important position in all work in physiotherapy wherein the effect of mechanical treatment is indicated or desired. It is particularly valuable in long standing chronic conditions, in all of which it will give at least a measure of relief satisfactory to and appreciated by the patient, who, previous to its use, has fallen into a state of helplessness and hopelessness.

Apparently the static machine is not now included as much as formerly in the equipment of those working in the field of electrotherapy. Those who are now taking up this line of work are more readily attracted to the various forms of high frequency apparatus, the sinusoidal wave generators, the vibrator, and the various therapeutic lamps, and to types of apparatus for producing ultraviolet rays. Several of the above mentioned may be placed in one or two rooms, not occupying a great deal of space for their manipulation. The static machine, that is, the most useful type, is large and must have a good sized room to accommodate its output and make possible its use for purposes of treatment. On this account many physicians pass up this valuable apparatus, in many cases through the selling argument of someone that "something else is just as good." Whenever possible, the physician engaged in the treatment of general conditions will find it largely to his advantage to provide room to accommodate this most useful agent, for it is certain that nothing will produce as good results where the production of mechanical effects is chiefly desired.

Your chairman on static currents has endeavored to get information from all members of this society who are using static electricity, but the following are the only reports received containing any information for use in this report:

TISSUE AND RELAXATION OF THE MUSCULAR SPASM

1. Dr. William B. Snow, New York City.

In all cases of noninfections inflammation as accumulated blood stasis will be present as the result of an influx into the tissue of a flow of blood occasioned by the shock of an injury, or other cause, in excess of what can pass through the capillaries. Such condition of stasis, until resolved, does not permit recovery or restoration to normal of the local condition of swelling with pain and congestion.

That this condition of things is "*Nature's method of cure*" has been too long the inherited notion of the medical profession; whereas, on the contrary, it is *Nature baffled*—a condition from which there is no natural means of restoration. Local stasis, unless resolved, leads to what is called "chronic inflammation," and occurs uniformly when resolution is not properly instituted. The end results are deposits of fibrin, adhesions, and finally hyperplasia, with organized thickening of the parts.

There is no agency so effective in removing the stasis occurring from injuries, or the subacute or chronic infiltration as it occurs in the pelvic organs, liver, spleen or other organs, as the static modalities—the wave current, sparks, and brush discharge. These methods render a service in therapeutics covering a wide range of indication.

Wherever this type of condition, which we call inflammation, occurs, we will find swelling from engorgement, associated with muscular tension in the tissues involved, and surrounding the site of the injury. The removal of the local infiltration with drainage of the tissues by an induced series of successive contractions with static modalities, by instituting cellular activity, forces out the infiltration pend up in the lymph spaces through the lymph channels. Coincidently, when the cause of the muscular spasm is removed, the condition is relieved.

Muscular tension, as present in the long muscles of an extremity which cross an inflamed joint, is removed by no other measure so promptly and effectively as with static sparks or the static wave current applied directly to the tense muscles, and without reference to the nerve supply.

An example of the relief of conditions of muscular spasm is exhibited in the treatment of "Charley horse." One application of the static sparks or wave current over the bunch of contracted muscles in that condition completely relieves the local spasm and, as a rule, not more

than a second treatment will be required to completely relieve the condition.

The infiltrated margin of wounds and ulcers treated with the static brush discharge, before hyperplasia occurs, can be healed with little or no scarring.

These are potent facts and accepted by all who are familiar with the technique and indications for employing the static modalities.

SUGGESTIONS TO COMMITTEE ON STATIC ELECTRICITY

2. Dr. M. G. Campbell, Atlanta, Georgia.

Static electricity is one of the most efficient physical therapeutic agents. Yet all over our country there are many idle static machines in doctors' offices and in warehouses of manufacturers of electromedical apparatus. Many doctors have bought static machines only to find them inefficient and unreliable. They have become disgusted and have discarded static electricity altogether as a remedy.

Through the best modern machines static currents have been kept from becoming obsolete. However, the difficulties encountered by an average medical man in running such a machine are very discouraging and will always keep the profession from using static electricity to any extent.

Some of these difficulties may be enumerated as follows: The efficient modern static machine of from twelve to twenty plates is a bulky piece of furniture and requires office space ten by twelve feet. To meet the demand of a paying practice, a doctor should have not less than two. These are expensive in the first place, and, where office rent is high, the space required is a great tax on the purse. The machine is troublesome to move in case of a change in office. The inability of securing someone capable of overhauling the machine when necessary. The uncertainty from humidity in most portions of our country in charging the machine. The increasing difficulty of obtaining unslacked lime for drying purposes.

When x ray was first introduced the static machine was used for exciting the tube. On account of these and other difficulties the manufacturers have developed machines along other lines. The commercial street alternating current of 110 and 220 volts has been utilized for x ray and high frequency purposes by specially designed machines. Following this idea one company developed a high frequency and x ray machine. This is a machine that gives a very high voltage and a very low amperage, and comes nearer to the static than anything else that has been brought out. It was introduced with an intention of competing with the high tension static machine. This machine will not produce diathermy effectively in the tissues, like their later makes and like those of another make. It produces heat by molecular or cellular vibration, like the static wave current. It does not, however, make the smooth, soft, slow vibration, like the static wave from the modern machine. This seems like one step toward solving the question on static electricity. A few changes might produce just the apparatus that is needed to give the same quality from a twelve to a twenty plate machine, with perfect control and with reliability and in a cabinet requiring very little office space. Our manufacturers have been led to think that x ray and high frequency modalities are wanted more by the profession, and have developed very efficient and reliable machines for these. We need to impress them with the importance of static modalities and to point out to them that we want just as efficient and reliable machines for this line as the others. We want the commercial street alternating current of 110 to 220 volts to be made to serve the field of static electricity as well as those of x ray and high frequency.

When this is done the medical profession may be induced to resume the use of this most efficient therapeutic agent.

3. The following is reported, without the name of the contributor, the same not wishing his name used.

In administering the wave current to a sensitive patient from a large static machine driven by an alternating current motor, it is often difficult to regulate the spark to the tolerance of the patient with the ordinary mechanical speed control, without at the same time increasing its frequency beyond the desired limit. A simple device to overcome this difficulty consists of a brass rod three-eighths inch in diameter and about two feet long, pointed at one end and with a rubber handle a few inches long at the other. This is laid across the case nuts on the front of the machine so that the pointed end is within an inch or two of the nut on the end of the rod holding the neutralizing combs. From this rod a short length of chain is allowed to hang over the discharge rod on that side.

If, with the machine running at a convenient operating speed, it is found that the rate of discharge is too rapid, the pointed end of the rod is pushed nearer the nut on the neutralizing combs, when a fine shower of sparks will be seen to pass, and, by a little manipulation of the rod and of the discharge rod, any degree of strength and rapidity of discharge may be obtained. In humid weather, when it is often difficult to obtain a slow, regular spark, the device is very helpful. By setting the end just beyond the point where any visible spark passes to the neutralizing comb nut, the slight leakage of current across to the pointed end will insure that slow, perfectly regular discharge which is so pleasing to the lover of the static machine.

4. Dr. F. Howard Humphris, London, England.

The following is the description of a device for the production of the surging effect which is described in my book (p. 41).

The apparatus consists of a small motor used to drive a small friction plate through a reducing gear. A swinging rod, similar to a metronome rod, is fixed to a sliding sleeve of insulating material, which has a leather sliding disc, which moves across the friction plate mentioned above. When the leather disc is pressing on the center of the friction plate, the swinging arm is stationary, and, of course, at its maximum when at the outer end of the disc. The speed is then about eighty to ninety per minute. The small motor is provided with a resistance, and hence, with this and the friction plate, any desired speed can be obtained.

The apparatus is placed on the ground near the platform, and, whenever the swinging arm touches the latter, the current is momentarily interrupted.

5. Dr. William Martin, Atlantic City, N. J.

When it comes to the static currents, I believe it is hard to find anything better than the good old wave current, and even the new frills some have given it, do not give me better results; so after trying the various

ones out I go back to the original wave and am sticking to it.

I do like the static induced at times, for it has its advantages: also, I like the resonator effuve, for I believe its usefulness has not been exploited sufficiently by most of us. I have seen it relieve venous stasis almost miraculously, and I would not know what to offer as a better method of treatment in certain cases.

6. Dr. F. C. Tice, Roanoke, Va.

I have been getting very satisfactory results in jaundice, pernicious anemia (so called), hepatic torpor, and hypertrophy with the static surge, as suggested by Dr. Travell, only I have modified the method by using a coiled spring instead of a straight wire attachment to the Leyden jar, as I found this to be more positive and regular in rhythm. The Travell effuve has also been wonderful in some kinds of skin infections, relieving pruritis and exudates, and sterilizing purulent states.

7. Dr. Norman E. Titus, New York City.

I cannot give you any particularly new information on static beyond commending most heartily to the use of Dr. Peterson's method of using the metronome when giving the static wave current. I have used this effectively and really feel that the results are increased with the addition of this variation of the wave current; and also find that all patients find that the current is more effective when given in this way. I certainly think that this method should be more widely used.

8. Dr. Harry Eaton Stewart, New Haven, Conn.

We have tried many methods of keeping the case dry and have finally settled on the use of lye in deep dishes, changed as necessary. The acid used by the British is difficult to handle. The lime sometimes breaks the muslin and fills the case, but lye is both convenient and safe. Another trick we have is using banana oil on the plates of the charger when there is difficulty there.

9. Dr. William T. Johnson reports that he is working on a wave current regulator which he hopes to complete in time to present to this convention.

Several other members of our association report that they are still using static machines in their work and that this apparatus has a distinctive value in the field of electrotherapy which nothing else can supply.

In presenting this report, it has been the policy of your committee on static electricity to make particular mention of practical ideas which have not been emphasized in reports of other years. The facts now before you should bring forth a generous and liberal discussion.

WILLIAM D. MCFEE, *Chairman.*
NORMAN E. TITUS.
J. WILLARD TRAVELL.
WM. BENHAM SNOW.

The Relative Effects of the Currents of High Frequency and the Static Modalities. WILLIAM BENHAM SNOW, M. D., Am. J. Electroth. & Radiol., 42:375-381, October, 1924.

THE contrasts of effects of the high frequency and static currents as here shown are as follows:

1. The administration of both the high frequency and the static currents accelerates metabolism. This is well established in the clinical experiences of most who employ these measures and confirmed by the experimental studies of Professor Steele with Dr. de Kraft and the author.

2. The best results upon metabolism from the high frequency current are obtained by the autocondensation method, and pronounced effects with the administrations of the effect d'Arsonval and mixed method are described.

3. The static wave current, applied as outlined, produces the most profound effect upon general metabolism, as evidenced by the greater elimination of solids in the experiments and in the clinical results obtained.

4. The treatment of conditions of local metabolism derives its usefulness from the induction of hyperemia, increased nutrition, increased metabolism, and destruction of germ life as employed by the direct d'Arsonval or diathermy method.

5. Diathermy is contra-indicated where acute stasis is present, but in the early stage trauma may antedate the establishment of stasis.

6. The high frequency current often softens degrees of local hyperplasia and, with the aid of the static current and the x ray, aids in removing organized induration from the tissues.

7. The static current is the measure *par excellence* for the removal of muscle spasm and local stasis, associated with acute inflammation occurring from trauma or from toxic causes, and of the forms of nephritis.

8. The static current effectively removes infiltration and the forms of neuritis.

9. The static current effectively removes infiltration from engorged organs that are not infected, as the liver, spleen, pancreas, kidneys, prostate, and uterus, and whenever hyperplasia has not already intervened.

10. The employment of the high potential currents requires a knowledge of technique with reference to the physical and physicological effect of the different modalities, and when used with intelligence and proper technique, they accomplish results in a large variety of conditions not to be obtained by other methods.

Surgical Problems in Carcinoma of the Breast. MARION C. PRUITT, M. D., F. R. C. S., J. M. A. Georgia, 13:477-479, November, 1924.

IN the problem of carcinoma of the breast, there are the two standard elements to be considered: first, prophylaxis, and second, active treatment.

1. As a prophylactic measure, the author suggests that the medical profession encourage the public to seek early advice from their physician on the first appearance of discharge from the nipple, crack, fissure, etc., since these are frequently the initial factors and signs of the beginning malignancy. All these cases are curable if recognized and removed early enough.

2. In the active treatment of cancer of the breast, the profession is divided into five groups: (a), Those confining their efforts to the knife alone; (b), those confining their efforts to the cautery alone; (c), those resorting to the knife and cautery first, then following the radical operation with the x ray treatment; (d), a smaller but increasing number who use x ray treatment as a preliminary, followed by radical extirpation of the growth and thorough postoperative radiation; (e), a still smaller group who use a massive dose of preoperative x ray treatment, followed by extirpation.

The author favors the application of actual cautery, giving for his reasons why the actual cautery should result in a greater percentage of permanent cures:

1. The heat is carried far beyond the point where the tissue is severed.

2. Excision with the knife may carry cancer cells in the noninfected portion of the wound.

3. It has been shown experimentally that the tissue outside the seared surface, which has been exposed to the red cautery, is not in a position to act as a cancer graft, while, after excision with the knife, any portion of the infected tissue beyond is sure to grow.

4. In operation with the knife one is constantly removing as little as possible for cosmetic reasons.

As to preoperative radiation, the author considers that there is sufficient evidence to justify the giving of a single intensive x ray treatment seven to eight days before the operation, which may or may not be followed by postoperative radiation. However, it too has its disadvantages:

1. The stimulation of fibrosis causes adhesions of the anatomical parts and therefore makes dissection much more difficult.

2. During the stage of reaction following radiation, capillary bleeding is much more profuse.

3. The reaction following radiation causes more or less temporary discomfort to the patient.

4. The length of time, suspense and expense frequently causes great inconvenience to the patient.

5. Some surgeons consider the possibility of the patient migrating to some other doctor or frequently into the hands of a quack.

6. The decrease in the size of the tumor may lead the patient to hope he has been cured and cause the operation to be put off until it is too late.

On the question of postoperative radiation, the author considers it very valuable but not as effective as preoperative radiation. All cases of cancer are curable provided the removal is early enough.

Malignancy. T. Byron King, M. D., J. M. A. Georgia, 13:480-486, November, 1924.

AMONG the seemingly worth while treatments which have been advanced in the last few years for malignancies are x ray and radium. It is probably the property of ionization, common to x ray and radium, to which the therapeutic value of these substances are due. Although the electrons from the very high powered x ray machines approximate the penetrability of radium rays, radium will always have the advantage of being readily placed in approximation with diseased tissue in certain anatomical locations. On the other hand, so many more electrons are sent out from an x ray tube than from a very large quantity or radium, that this makes more homogeneous radiation possible from x ray. Supposing that this radiation results in a rearrangement of those electrons already present, some tissues are much more readily influenced by radiation than are others. This radiosensitiveness accounts in a large measure for the possibility of curing malignancy by radiation. It is an accepted fact that the more highly differentiated, the more radioresistive the cell. Malignant growths, then, being more or less embryonic in nature, are more radiosensitive than normal structure. For example in cancer of the breast, if the growth is not freely movable, or if there is the slightest evidence of metastasis, surgery should not be resorted to before preoperative, and postoperative irradiation should be insisted upon. Dr. Bumpus of the Mayo Clinic considers in certain types of cancer, radium as efficacious as surgery. The closest co-operation between radiologist and surgeon is therefore the condition of choice.

Radium Treatment of Malignancy. Frank M. Hagans, M. D., Illinois M. J., 46:336-339, November, 1924.

CONSIDERING the eradication of the clinical manifestations of malignancy as a "cure" for the disease, the author states that radium treatment has apparently cured a certain group of malignancies. This group of cases includes the more superficial and less rapidly metastasizing forms of carcinoma.

To treat cancer cases, they should be treated early and thoroughly. Thoroughly treating cancer includes radiation, no matter what other form of treatment may be used in combination. Radium is the best form of radiation to apply locally to a superficial lesion and in regions where glandular metastases are likely to take place.

Radium needles are used mostly in epitheliomas and are the plain metallic needles containing radium sulphate in the amount of five to ten milligrams. The technique of application is usually the through and through method. An external application of a radium plaque may be given if the affected glands are small. If the glands are of considerable size, the radium needles may be inserted directly into the glands.

The direction of the insertion of the radium needles into the malignant growth is about two and one-half centimeters apart. The length of exposure is governed by the density and vitality of the tissues and the proximity of the vital structures. It is possible to have needles remain in place in some tissues as long as twenty-four hours. Radium needles make it possible to treat malignant lesions more successfully in easy accessible lesions.

There are two contra-indications for the use of radium: One, a palpable tumor above the symphysis, and the other, a pus tube.

Some tumors are highly resistant to radiation, while others are remarkedly susceptible to radium, such as the lymphosarcomas, and the embryonal carcinomas. The treatment of malignant conditions by the combined methods, principally radium and x ray, or radium and surgery, or with electrothermic methods, has been shown from clinical experience to be sound practice.

"It is highly important for the interests of radium therapy, that the users of radium, the medical profession, and the public at large should recognize that radium therapy is fast getting beyond the experimental stage."

Radiation in the Treatment of Primary Malignant Disease. G. E. Pfahler, M. D., Atlantic M. J., 28: 76-80, November, 1924.

1. Primary carcinoma should yield as readily to radiation as recurrent or metastatic disease.

2. Inoperable primary carcinoma can sometimes be made operable by thorough preliminary radiation.

3. Preliminary radiation in an operable case will devitalize the carcinoma and should make recurrence and metastasis less likely.

4. Basal cell epitheliomata of the skin yield in particularly all instances, especially if radiation can be combined with electrocoagulation.

5. Primary squamous cell carcinoma should be treated by preliminary surface radiation, local destruction by electrocoagulation, and the insertion of radium locally, and into the adjacent tissues.

6. A preliminary conference between the surgeon and radiologist will probably be followed by the most satisfactory results to the patient.

Radium in the Treatment of Rodent Ulcers at Sydney Hospital. LANGLOH JOHNSTON, M. B., Ch. M., Med. J. Australia, 2:467-471, November, 1924.

RADIUM has been used in the treatment of rodent ulcers at the Sydney Hospital, Sydney, Australia, since 1911, and according to the author, 90 per cent of the patients have been absolutely cured. All seventeen of the patients whose illustrations accompany the article, were treated more than ten years ago, and have been pronounced permanently cured.

Basing his observations on this data, the author asserts that radium is of special value in the treatment of rodent ulcers not only because of the permanency of the cure but also because of the aesthetic value, the clean, even, absence of retraction scar that results. Radium is very convenient and easily applied, there is absence of pain, and the shape of the apparatus can easily be adapted to the region to be treated.

What Progress is Being Made in the Treatment of Cancer? BYRON B. DAVIS, M. D., F. A. C. S., J. Iowa State M. S., 14:494-500, November, 1924.

AS an introduction to his article, the author discusses his conception of the possible origin of cancer. In the opinion of the author, cancer arises as the result of some chronic stimulus, some chronic irritation, that results in the cell losing its physiological restraints and growing irrespective of form and function.

In this paper a casual study of the results attained by some of the foremost surgeons in the treatment of cancer in the various regions of the body is given:

1. In cancer of the tongue, in the past few years, the mode of treatment has been considerably modified. There seems to be little doubt that a removal of the local lesion by means of cautery, courageously employed, or by radium, is replacing the knife.

2. In cancer of the lip, prophylaxis and operation on the cases while localized will be followed by a large percentage of cures.

3. As to cancer of the breast, the report of Tichy on cases of cancer of the breast treated at Marburg is given. These cases are divided into three groups: Group 1, cases not x rayed after operation; Group 2, cases in which the scar was x rayed after operation; Group 3, cases intensively x rayed after operation.

A study of the table presented indicates that the most favorable results were obtained in those cases intensively x rayed after operation. The author, however, makes the additional observation that more cases died of metastases and the internal metastases were more numerous and more marked among those intensively x rayed. In his opinion, although the x ray has been used for a number of years as a postoperative medication, it does not add to the chance of cure and in some cases has appeared to be detrimental.

4. With cancer of the stomach, an entirely different problem confronts the medical profession. Before sufficient clinical symptoms manifest themselves to cause the patient to consult a doctor, the pathology is usually far advanced. It is, however, almost universally accepted that cancers of the stomach frequently arise from chronic gastric ulcers. Such being the case, the mortality from gastric carcinoma should be cut down by the treatment of these gastric ulcers. If proper medication does give a permanent cure, both symptomatically and roentgenographically, then the ulcer should be incised.

5. In discussing cancer of the cervix uteri, the classification of Clark is given. Clark divides carcinoma of the cervix according to the progress that is made into three groups: Group 1, operable cases, the disease being confined to the cervix as far as can be ascertained. Hysterectomy followed by radium is his treatment for this group; Group 2, borderline cases, some invasion of the vagina and broad ligaments being present. This group he begins by treatment with radium, and follows by hysterectomy if the radium treatment produces a condition which warrants it; Group 3, inoperable cases in which the invasion of the surrounding structures is so great that successful operative removal is impossible. In these cases, he depends principally upon radium, supplemented if necessary, by local removal of the fungating masses by excision, scraping or diathermy.

Taussig reports the result in over 1,000 collected cases of cancer of the cervix treated by radium in which 20 per cent were well five years after the operation.

In the words of the author, "with the good results shown, all advanced cases should have the benefit of radium. With added experience in technique, radium seems destined to replace operation in all but the early cases of cervical carcinoma. Good cooperation between surgeon and radiologist ought to brighten this gloomy chapter."

6. In cases of cancer of the fundus uteri, the author deems it advisable to use operation, since the results from operation are so good that most surgeons prefer to treat them by panhysterectomy and refer only the advanced cases for radium treatment. A citation is again made from Clark, "in cancer of the cervix, when in doubt use radium. In cancer of the fundus, when in doubt, operate."

Effect on Tumors of Radiation of Different Wave Lengths. FRANCIS CARTER WOOD, M. D., Am. J. Roentgenol., 12:474-481, November, 1924.

THE experiments cited by the author tend to solve the problem for the effect on animal tumor cells by equal ionization doses, as measured under specified conditions. Whether such equal ionization doses are equivalent to equal quantities of radiant energy is a question for the physicist. It is probable, however, in the opinion of the author, that such open chambers are far more reliable than the closed type in which the secondary radiation, since scattering introduces errors which we have no satisfactory means of estimating. Calibration with an open chamber is the only method at present applicable.

As far as these experiments go, therefore, they point to the fact that within practicable limits of wave lengths there is no difference in the lethal effect on tumor cells of long and short wave length radiations provided equal quantities are employed.

Radium Treatment, With Observations Upon Its Action in Selected Cases. GEORGE C. WILKINS, M. D., F. A. C. S., Boston M. & S. J., 191:1014-1018, November, 1924.

IN epithelioma of the skin, even when the deeper tissues have be-

come invaded, radium is the treatment of choice. In these cases radium needles are used, imbedded into the deeper tissues 1 cm. apart. The destruction of the malignant tissue is followed by practically no scarring and the treatment is more consistent in its effect than operative measures.

In the treatment of cancer of the oral cavity, the knife has no place. In the opinion of the author, the knife only adds to the chances of recurrence. It is his custom to thoroughly apply electrocoagulation over the entire involved area first, under a local or general anaesthetic, followed immediately by the insertion of radium deeply throughout the destroyed tissue. The electrocoagulation seals the blood vessels and lymph steams in the vicinity of the malignant tissue. Often it is physically impossible to remove the growth in the oral cavity by surgery, because of the obscure location, but electrocoagulation and radium have been used in combination in these cases for successful eradication.

Three patients have been successfully treated for recurrences after the surgical removal of cervical cancer just below the ear. These patients have all been without signs of further recurrence for two years or more.

"Much has been written about the treatment of cancer of the cervix, operation versus radium. I think all will agree that the border line cases will show as many cures with radium as with operation. All will agree that the somewhat advanced cases will show better results with radium, while in the really advanced cases surgery can do nothing, while radium will relieve pain for a while, will stop hemorrhage and prolong life. The only real argument, then, concerns the early cases and the recent preliminary report of the committee by the American College of Surgeons, to investigate this subject, of which committee Dr. Greenough is chairman, reveals many interesting figures. It would appear from this report that the patient with favorable cancer of the cervix has a one to four chance of cure by operation, and a one to three chance with radium. Unfortunately, however, the report shows that the patient who is treated by hysterectomy must assume a one to five chance of dying from the operation itself. This operative mortality is too high to be passed over without giving it thoughtful consideration. Also keep in mind that these figures refer to the favorable cases, which are, unfortunately, few in number.

Adenocarcinoma of the fundus uteri is best treated by panhysterectomy, followed by radiation of the pelvis. Peroperative radiation, intrauterine, up to 2400 milligram hours is also of undoubted value.

In numerous nonmalignant diseases, with associated excessive flowing, that have been successfully treated with radium are, menorrhagia, the smaller uterine fibroids and tuberculous adenitis. It should be borne in mind that radium should not be used in the uterus where there is an associated pelvic inflammation, even though the inflammation be of the chronic type, for radium will stir into activity the dormant organs. The benign fibromyomas of the uterus respond well to radiation, the radium being placed within the uterine cavity, usually for two to twenty-four hours, the dosage depending upon the size of the tumor. In the opinion of the author, radium is the treatment of choice in tuberculous adenitis, but the glands should be treated as soon as they are discovered. It is to be remembered that large cervical glands may be due to sarcoma, Hodgkin's disease, and leukemia, and that radium is still the best method of treating multiple glandular tumors.

The Influence of Radiology Upon Our Conceptions of Disease. SIR THOMAS HORDER, Bt., M. D., F. R. C. P., Brit. J. Radiol., 20:147-162, October, 1924.

IN this article, the author considers the position that radiology occupies in relation to other parts of the scheme of medical study. In the conception of the nature and the extent of disease processes, clinical medicine is capable of contributing admirably clear pictures as the result of careful examination of the surface of the body. By the exercise of the trained hand and ear, clinicians are able to elicit physical signs of lesions lying beneath the surface. But for ocular demonstration of any disease process which affects deeper structures and which often cannot be demonstrated by physical signs, medicine is dependent upon three methods: There is the experience of the postmortem room, there is the brief and limited observation afforded by surgical operations, and there is the valuable help given by x rays.

The radiologist is able in many cases to study both structure and function, he has ample time for his observations, and he can submit these to such of his colleagues as are competent to offer suggestions and interpretations resulting from their own special experience of disease in other fields.

Against these advantages there are the disadvantages that the radiologist's observations are much more difficult, and therefore his interpretations of what he sees are much more liable to error. He deals with shadows rather than with substances, and this fact alone places a serious limit, if not to the range of his methods, at least to the rate of his progress. Despite this and other obstacles, radiology is probably at the present time the branch of medical science which is most responsible for changing our views in regard to disease processes in a number of directions, confirming a number of hypothyses, eliminating others, and suggesting new lines of thought.

Value of the Roentgen Ray in Diagnosis of Tumors of the Jaw. GORDON B. NEW, M. D., and FREDERICK A. FIGI, M. D., J. A. M. A., 83:1555-1557, November 15, 1924.

IN the diagnosis of tumors of the jaws, the roentgen ray is of value in determining whether the condition is primary or secondary, whether involved in an inflammatory or malignant process. It is necessary to make the examination from various angles, receive various x ray views and observe carefully the shape of the tumor, the character of the outline of the shell, the destruction of bone, or the production of bone taking place, each lending important information for the diagnosis. The age of the patient and the clinical history may be of aid in determining whether or not the tumor is malignant, benign, or inflammatory.

A roentgenogram is of value in the diagnosis of certain types of tumors found only in the jaws, such as leontiasis ossium, solid odontomas and the cystic odontomas, including the adamantinomas.

An expanding unilocular cystlike tumor of the jaw may be a benign cyst, central carcinoma, endothelioma, giant cell tumor, fibroma, myxoma or cyst odontoma. The varying density and the presence of striae of bone may aid in differentiating these.

It may not be possible, from the roentgenogram and the clinical history, to determine whether a condition is inflammatory, benign or malignant. Exploration and removal of tissue for frozen microscopic section should be made in questionable cases.

Removal of Tonsils by Electrocoagulation. ALBERT C. CARLTON, M. D., Calif. & West. M., 22:554-556, November, 1924.

ELECTROCOAGULATION may be defined as the application of the D'Arsonval high frequency current, measured by a milliamperemeter, controlled by suitable apparatus, producing sufficient heat by resistance in its passage to coagulate and destroy living tissue.

Under the influence of a local anesthetic, coagulation is painless, hemostatic, sterilizing, without shock or physical taxation and commends itself to timid patients and those who for constitutional reasons should avoid general anesthesia, loss of blood or mental stress.

Although electrocoagulation may have some salient features to commend it, experience has proved to the author that it is not a procedure to be employed in every case.

The destruction of tonsils by the electric current is not new, but recent improvements in apparatus and methods have brought it into prominence. In the experience of the author, from 300 to 400 milliamperemeters destroy tonsillar tissue, when applied from ten to thirty seconds after application, according to the density of the tissue. "Electrocoagulation of tonsils will find its place, when methods of operation and apparatus will have become standardized, for selected cases as mentioned herein."

Treatment of Carcinoma of the Esophagus by Radiation. D. CROSBY GREENE, M. D., Am. J. Roentgenol., 12:471-474, November, 1924.

THE author in a brief way explains the method of his procedure. After a preliminary diagnosis by means of a history and roentgenoscopy, esophagoscopy is done under local anaesthesia. A specimen of the growth is taken for microscopical study. Bougies are passed to determine the permeability of the stricture. If the growth shows the gross appearance of carcinoma, radium emanation seeds are inserted into the growth under direct vision. The author does not boast any claims of having effected cures by this means but states that the results have been most effective and satisfactory.

External radiation, preferably by high voltage roentgen rays, aids in slowing up the tumor growth, but so far has not controlled it.

An early gastrostomy offers the major portion of this relief. Although the operation of gastrostomy is relatively serious and productive of little benefit, when practiced as a last resort in late cases, it is comparatively safe and results in marked improvement in general condition and in maintenance of body weight and strength when done in early cases. This operation is usually recommended by the author as soon as the diagnosis is made and the patient is told to take no food by mouth. With rest and cleanliness of the esophagus thus induced, and the nutrition maintained, it seems reasonable to expect more favorable results from radiation than have yet been obtained.

In conclusion, the author emphasizes the feasibility of radium insertions in this region. Notwithstanding the obvious risks, the method may be practiced with comparative safety by one who has acquired the requisite skill in esophagoscopy and technique of insertion.

Carcinoma of the Buccal Mucous Membrane. CHANNING C. SIMMONS, M. D., Boston M. & S. J., 191:1018-1022, November 27, 1924.

TREATMENT of carcinoma of the buccal mucous membrane may be classified into the following progressive stages:

1. In precancerous lesions, excision of the tumor is advocated by the writer.

2. In very early cancer, intrabuccal excision followed by cauterization of the raw areas is used. Plumber's cautery is used in preference to electrocautery for it is the opinion of the author that this method retains the heat better in the presence of blood and saliva.

3. In cancer with a few or no palpable glands in the neck, intrabuccal excision of the growth is followed with cauterization.

4. In cancer with definite glandular metastases, intrabuccal excision is followed by x ray radiation of the glands of the neck.

5. In inoperable cancer, radium treatment of the local condition is combined with x ray exposures over the glands of the neck. Radium seeds are implanted in the growth, varying in number from five to twelve, depending on the size of the growth.

6. In postoperative recurrence, radium seed treatment to the local recurrence and x ray exposures of the glands of the neck, is advocated by the author.

Thoughts on the Modern Methods of Diagnosis and Treatment in Digestive Diseases. BRUCE C. LOCKWOOD, M. D., J. Mich. M. S., 23:458-462, November, 1924.

IN the course of the various subjects discussed in the article, particular mention is made of the value of roentgen ray diagnosis. In the words of the author, "there is no other single method that compares in diagnostic value to the fluoroscopic x ray study, supplemented, when necessary, by films for finer detail and permanent record. Its great value has caused a tendency by many physicians to neglect other procedures and accept a negative or positive x ray report without even doing a good physical examination. This is deplorable, for from x ray studies alone diagnosis cannot often be made. X ray signs are generally caused by rather gross pathological changes and many functional changes are overlooked, such as achylia, colitis, gallbladder disease, etc. There are conditions that can only be shown by the x ray and it is our belief that every patient presenting digestive symptoms should have a fluoroscopic examination and a gastro-intestinal study. However, the x ray is but one of the many means of reaching a diagnosis, none of which, except in occasional instances, is capable of furnishing the diagnosis *per se*, but each of which should be used in proper proportion in reaching a probable diagnosis or an absolute diagnosis."

Syphilis of the Stomach With a Study of Ten Probable Cases. A. S. MERRILL, M. D., Am. J. Roentgenol., 12:444-453, November, 1924.

SYPHILIS of the stomach is a late manifestation of the disease. It is not recognized in its early stages and an early pathology is not seen. It is a rare condition but is probably not as rare as it has been supposed in the past.

The diagnosis rests upon a history of the infection, positive Wassermann reaction, the demonstration of a gross gastric lesion and cure or definite improvement under antisyphilitic treatment. Absence of history or signs of

syphilis and a negative Wassermann reaction do not exclude nor does a positive Wassermann reaction prove absolutely the nature of the condition.

The possibility of syphilis should be considered in atypical cases and those resisting accepted methods of ulcer treatment.

The symptomatology is very suggestive, resembling benign ulcer with the chemical and roentgen findings of cancer. Roentgenographic demonstrations illustrate this similarity. Its course begins irregularly and tends to become continuous. The common complaints are pain or distress immediately after food enters the stomach, not relieved by alkalies, aggravated by food, and relieved by vomiting. The appetite in these cases is always good. A progressive course follows with marked loss of weight unaccompanied by the degree of cachexia and weakness as seen in cancer of the stomach. A palpable tumor is uncommon. Anacidity or achylia is the rule. The gastric involvement is generally extensive.

Antispecific treatment gives marked relief in all but very advanced cases. The cicatrical contractions do not disappear under treatment and surgery is often indicated in those with extreme deformity of obstruction.

Final proof is difficult, and presumptive evidence should be considered grounds upon which to give the benefit of antisyphilitic treatment.

Anatomically, the lesion consists of multiple irregular ulcers of gummatous origin with thickened submucosa, cicatricial contractions, vascular changes, perivascular infiltration, and diffuse infiltration of leucocytes and plasma cells.

Roentgen evidence is not characteristic but is valuable in determining the location and extent of the lesion and should be used in conjunction with all other possible evidence in reducing the probable diagnosis.

Demonstration of the organisms in the tissues would be final proof but must not be expected.

An extensive bibliography accompanies the article.

Roentgenologic Diagnosis of Cholecystic Disease With the Aid of the Sodium Salt of Tetrabromphenolphthalein. RUSSELL D. CARMAN, M. D., and VIRGIL S. COUNSELLER, M. D., Am. J. Roentgenol., 12:403-413, November, 1924.

THE technique of the administration of the sodium tetrabromphenolphthalein has received some modifications. Because of the severity of the initial reaction, simulating a vasomotor shock, characterized by severe pain in the region of the dorsal and lumbar spine, flushing of the skin, and an increase in the blood pressure, it has been suggested by the authors that the method be considered contra-indicated in cardiovascular disease, particularly arteriosclerosis and chronic cardiac disease.

Because of the numerous reactions, the standard dose, of 5.5 gm., was reduced to 4.5 gm. As the reactions simulate those of vasomotor depression, 10 minims of a 1:1000 solution of adrenalin chlorid is advised by the authors to be given hypodermically just as the blood pressure begins to rise after the initial drop. This checks the nausea and vomiting and restores the blood pressure to normal. The shadows of the gallbladder, obtained following the 4.5 gm. dose, have been quite as satisfactory for diagnostic purposes as those produced by the original dose of 5.5 gm.

The technique outlined by the authors reads as follows:

"1. The patient is hospitalized during the first twenty-four hours. No special preliminary preparation is required, but neither fluid nor food is taken after 5 a. m. of the day of the examination, nor are enemas or cathartics given.

2. Four and one-half grams of the salt is added to 40 cc. of triple distilled water, heated slowly and stirred gently until it dissolves, which readily occurs. The mixture is then sterilized in a boiling water bath for fifteen minutes and cooled to body temperature for use.

3. The dye is administered intravenously in two equal portions, one-half hour apart. It has been found that if the dose is divided the second portion is better tolerated. The median basilic vein is selected whenever possible. If the cephalic vein is used, thrombosis may occur. Extreme care is taken that none of the solution gets outside the vein, for it is very irritating. To aid in avoiding this, two syringes, one with normal saline and one with dye, should be used. After free entrance to the vein is obtained, with the normal saline, the barrel of the syringe is disconnected and the one containing the dye is substituted. The injection is made slowly, consuming from five to seven minutes. Rapid administration is apt to produce toxic symptoms and severe pain along the vein. Heat relieves the pain, causing it to disappear in from one to two hours.

4. Roentgenograms are made at the fifth, eighth and twenty-fourth hours and, if desired, at the thirty-second and forty-eighth hours, after giving the dye. Roentgenograms should always be made also prior to giving the dye. When they yield positive findings the dye test is unnecessary.

5. The stomach and duodenum are kept as nearly empty as possible by giving only a glass of milk or cup of tea at noon, a small amount of water in the afternoon and a nonprotein dinner in the evening. The next morning the patient may resume the normal diet and be dismissed from the hospital."

It will be found that the normal gallbladder will retain sufficient dye to cast a shadow at the fourth or fifth hour after administration. The maximum intensity will be reached some time between the eighth and twenty-fourth hour plates, becomes progressively thinner until it disappears between the twenty-fourth and forty-eighth hours. The shadow is oval or pyriform, with an even contour, and should be homogeneous. It is larger at earlier than at succeeding hours. This variation in size is important evidence of normal distensibility and contractibility.

Abnormal responses, on the other hand, include failure of the gallbladder to fill with the dye, scanty fillings as shown by persistent faintness of the shadow, delayed filling, marked delay of emptying, deformity of contour, unvarying size of the shadow, constant extremes of size, and mottling or central defects. In the absence of cirrhosis or gross impairment of hepatic function, interference with filling suggests obstruction, due to gallstones, adhesions, new growths, thickened bile or other pathological conditions. Unvarying size of the shadow implies loss of elasticity of the gallbladder walls. Mottling of the shadow suggests stones or papillomas.

A Clinical Study of Some Common Anatomical Abnormalities of the Colon. JOHN L. KANTOR, Ph. D., M. D., Am. J. Roentgenol., 12: 414-430, November, 1924.

CONGENITAL anomalies of the colon, such as redundancy, have heretofore been largely the concern of the anatomist and the surgeon. The clinical significance of these malformations is the subject of the present study, which is based on 62 cases in a series of 668 gastro-intestinal roentgen ray examinations. Redundant colons are by no means a rare anomaly. It has been found by the author to occur in from 9 to 14 per cent of all persons and in 23 per cent of all constipated individuals. It is more common in sthenics than in asthenics, and in men more than in women.

Symptoms are brought on by strain or injury or by abuse of colon function. Redundant loops are in themselves not necessarily obstructive to the passage of feces, but may become so under certain conditions of localized stasis or sudden changes in posteur with or without interference of the blood supply. Perhaps two-fifths of all cases of redundant colon show no symptoms.

Constipation and gas distress are the most common symptoms. Pain is almost as common. Volvulus, though rare, considering the frequency of the condition, occurs only in redundant bowels.

The diagnosis is made by roentgen examination. A differential diagnosis is to be made from gallbladder disease, appendicitis, colon cancer, and cardiovascular disease.

The therapy consists in restoration of colon function where it is decompensated, and otherwise in noninterference. Vicious cathartic and enema habits should be discontinued. Spasticity should be overcome by rest, lubrication and antispasmodics. Surgery is not indicated for redundancy as such, and should be reserved for superimposed accidents such as twists and torsions.

Some Anomalies of the Kidney. B. H. NICHOLS, M. D., Am. J. Roentgenol., 12:431-438, Nov., 1924.

ANOMALIES of the kidneys may be roughly classified as (1) anomalies of number, (2) anomalies of position, and (3) anomalies of form. Among these groups the first is of especially vital importance to the genito-urinary surgeon.

1. Anomalies of form includes: (a) Congenital solitary kidney. This is of rare occurrence, only occurring about once in every 1,000 individuals. In such a case, pyelograms will show a normal kidney and ureter on one side and only a rudimentary ureter on the opposite side. These cases are usually sent to the roentgenologist because of some pathological condition other than the anomaly found. (b) Congenital atrophy, or hyperplasia of the kidney, is the result of arrested development, which may have occurred at any stage in the development of the foetus, so that this type of anomalous kidney may show any variation in size from microscopic to nearly normal. From the practical standpoint, the extent of the anomaly is not of great importance, as the advisability of an operative procedure depends upon the results of the functional tests, the important point being the discovery that the anomaly exists. (c) Fused kidneys may assume a number of different forms, the most common of which is the "horseshoe" kidney, so named from the crescent shape. A horseshoe kidney casts a continuous shadow across the spine, from one lower pole to the other, and the two kidneys appear to assume a vertical position. (d) The duplex kidney varies from what may appear as little more than a large cephalic calyx to complete duplication of the pelvis and ureters.

2. Anomalies of position includes: (a) Ectopic kidneys and misplaced kidneys, which may be grouped under the common term, pelvic kidneys, are low lying kidneys which derive their blood supply from the iliac artery, and have short renal arteries and pedicles; a low lying kidney, the position of which is due to arrested ascent or traumatic displacement, derives its blood supply from the aorta. A low lying kidney, the position of which is the result of arrested development, may have an undeveloped pelvis and be confused with a true ectopic kidney. (b) Renal torsion may be acquired or congenital. The usual normal position of the kidney is between the level of the 12th dorsal vertebra above and the 3rd lumbar below, the long axis being directed downward and laterally.

3. Anomalies of form are considered under the head of polycystic kidney. This type is rare. The polycystic kidney, as its name implies, is characterized by many cystic areas, some large and some microscopic in size, located for the most part at the renal parenchyma. Hydronephrosis may also be present, caused by the obstruction from the cysts. Occasionally these cysts may rupture and the resultant filling of the cavity with the injected medium may suggest pyonephrosis, but a careful study of the irregular outline of the kidney will usually reveal the true nature of the pathology.

Physiotherapy in Renal Tuberculosis. W. F. MARTIN, M. D., J. Urology, 12:493-513, November, 1924.

RENAL tuberculosis is generally considered to be a local manifestation secondary to a primary focus elsewhere. In the treatment of such a condition, the author does not claim a cure, but outlines a routine method of treatment which has been found to benefit the patient. This routine treatment begins with the strict dietary regime, followed by heliotherapy, diathermy, hydrotherapy, local applications by irrigation, and rest in bed by hospitalization.

It has been found that the Alpine light, administered to the skin until it is thoroughly tanned, has hastened the relief of bladder infections and other complicating conditions. With diathermy, the technique used is a six inch electrode placed posteriorly over the kidney, with an eight inch electrode placed anteriorly. Beginning with 500 milliamperes, the strength is gradually increased to 1,000 milliamperes and the exposure time varied from ten to thirty minutes at a time. Hydrotherapy is used daily for the analgesic and tonic effect. Hot and cold hydriatic treatments, fomentation over the kidneys, the wearing of moist abdominal bandages, and hot sitz baths, all help in the allayance of pain. Graduated cold applications, sprays, etc., act as tonics for the body, stimulating nature's resisting power. Irrigations are given for painful cystitis, and rest reduces the katabolic processes and lessens the excretory work of the kidneys. Whatever the treatment that is to be attempted for each individual patient, specific instructions are essential.

The Effect of Roentgen Rays on the Adrenal Gland. CHARLES L. MARTIN, M. D., FRED T. ROGERS, Ph. D., and N. F. FISHER, M. S., Am.

J. Roentgenol., 12:466-471. November, 1924.

DIRECT heavy radiation of the isolated left adrenal, administered following the removal of the right adrenal of a dog, produced no symptoms during practically a month of observation, although a marked fibrosis occurred in the radiated gland.

The same dose produced cachexia and death when applied to an isolated loop of intestine and marked fibrosis when applied to the upper pole of the kidney.

X Ray Treatment of Carcinoma of the Uterus. R. T. WILSON, M. D., Texas State J. M., 20:430-434, November, 1924.

"WE do not believe that the x ray therapy should be substituted for surgery in the treatment of carcinoma of the uterus, but after the surgeons have done everything possible in their line of endeavor, there is still plenty of work left for the roentgenologist. We believe it is impossible to overemphasize the importance of thorough and intensive x radiation with highly penetrating rays of the pelvis of every patient, covering the primary focus of disease of the entire lymph drainage. After the cases have been carefully classified and all the removal performed consistent with good judgment and based on the nature and extent of the disease, and after radium has been scientifically applied where indicated, then with few exceptions, if any, should radium be given. In other words, every patient should have the benefit of the high voltage x ray therapy along or, in properly selected cases, in combination with radium or with the cautery or with both. It is our humble judgment that in the light of our present knowledge of this subject our greatest hope for the improvement of the mortality rate in this disease lies in this method of treatment."

The Use of Radium in the Treatment of Benign and Malignant Conditions of the Uterus. THOMAS B. SELLERS, M. D., New Orleans M. & S. J., 77:217-222, November, 1924.

EVERY gynecologist or physician doing gynecology should so familiarize himself with the therapeutic properties of radium that he should be able to determine when it should be used, the dosage, and the amount of screening. Much of the prejudice against the use of radium is due to either faulty technique in its application, improper dosage, or a lack of knowledge of its indications and its limitations. There are, however, basic principles in treating carcinoma of the cervix presented by the author:

1. Do not apply radium where there is extensive involvement of the rectovaginal or vesicovaginal wall, as there is danger of causing fistulae.

2. Prepare the patient as for a vaginal operation and give a general anaesthetic (preferably nitrous oxide and oxygen), so the radium can be properly placed. Pack the vagina well with gauze to hold the radium in position. Do not let the patient sit up until after the radium has been removed.

3. Only remove sections from the cervix when the diagnosis is questionable and do not cauterize the cervix prior to applying radium, for this does not aid in the treatment, but increases the risk of infection and of dissemination of the growth.

4. The family physician and patient should know what to expect—also the necessity for subsequent treatment and observation.

Radium is the treatment of choice in intramural uterine fibroids, not larger than a four months' pregnancy in women over forty years of age. This is also true of small subserous fibroids. A preliminary application of radium or x ray will often make surgery possible and safe in removing large fibroid tumors incarcerated in the pelvic cavity (encroaching on bladder and rectum).

Radium has become the method of choice in handling irregular uterine bleeding in girls and young women. Before using radium a careful vaginal examination should be made under local anaesthetic to be sure of accurate diagnosis. In young girls it is not safe to apply over 50 mg. of radium for four hours.

In menorrhagia, the dosage of radium is not of great value. The custom of the author is to give one large dose to be sure of stopping the hemorrhage, instead of giving repeated small doses.

X Ray Treatment of Fibroids and Uterine Haemorrhages. J. VAN ROOIJEN, M. D., M. R. C. S., L. R. C. P., S. African M. J., 22:500-504, November 8, 1924.

IN summarizing the article, the author makes note of the indications and contra-indications for x ray therapy in uterine fibroids and hemorrhages. The points in favor of x ray treatment are listed as follows:

1. The primary mortality from hysterectomy amounts in several of the best clinics as high as 1 to 5 per cent of the cases.

2. There is no danger involved in the x ray treatment. X ray burns in the treatment of fibroids never occur with the proper technique.

3. Symptoms from the nervous system after the operation are rather frequent after hysterectomy, and very much less after radiation.

4. Atrophy of the parametria, vaginal walls and vulva is more marked after the operation than after the x ray treatment. The preservation of the portio vaginalis in the latter case is an important asset.

5. Local after effects are not at all infrequent after operation and do not occur after radiation.

6. The x ray treatment can be carried out at a much less inconvenience to the patient and at a much less expense.

The observations made opposing x ray therapy are:

1. Vasomotor symptoms may in some cases be very troublesome. Although they are more liable to occur in young people, youth is not a contra-indication when hysterectomy is the alternative.

2. The tumor may not be sufficiently reduced and the pressure symptoms may remain. This applies to the large and hard tumors and these should therefore be reserved for operation.

3. Acute pressure symptoms may not be relieved soon enough.

4. For some unknown reason, gout has been found to be a contra-indication for x ray treatment.

Taking into consideration these various indications and contra-indications for the application of x ray therapy, the author concludes that in a case of fibroids of the uterus the question should not be whether or not there is a contra-indication to operation, but whether there is any against radiation. The latter is the method of choice in by far the greater majority of cases.

Roentgen Ray Treatment of Uterine Fibromyomata and Uterine Hemorrhage. I. S. TROSTLER, M. D., F. A. C. R., F. A. C. P., Radiol. Review, 1:44-49, Nov. and Dec., 1924.

ROENTGENOTHERAPY is the treatment *par excellence* for uterine hemorrhage and uterine fibromyomata, unless contra-indicated, because:

1. It is safer for the patient.
2. It is pleasanter for the patient.
3. It is applicable in the cases which are a bad surgical risk.
4. It is not necessary for the patient to enter the hospital or lose any time.
5. The menopause, if produced by the treatment, is less sudden than when surgery is used, and consequently there is less nervous shock.
6. The percentage of cures in properly selected cases is as great or greater than any other known method of treatment.

Roentgenotherapy should only be administered by graduates in medicine of adequate training in the specialty of radiology, and should never under any circumstances be administered by lay technicians.

New Techniques of Curie Therapy of Cancer of the Cervix Uteri. PROF. DR. FRANS DAELS AND DR. P. DE BACKER, Brit. J. Radiol., 29:315-321, September, 1924.

THE necessity of homogeneous irradiation of the true pelvis compelled the authors to try and irradiate the pelvis by means of two series of radium tubes, placed forward and backward in the sideparts of the pelvis and, if possible, to use three series of tubes placed in the sideparts: forward, backward and lateralward.

"Our instruments consist of a half-circle, 40 cm. in length, and with a radius of 12 cm. long. Radium cartridges of 3.3 radium elements, or of 2 radium elements are brought two and two in platinum tubes, whose sides are 1.5 mm. thick; two of these tubes are brought in an india rubber tube, and this india rubber tube is firmly fixed on a chain, whose structure is different from each of the different series placed either backward or alongside, or forward in the pelvis. The links are 1 cm. long, with a cross beam in the middle (backward), or simply 1 cm. long (forward), or one-half cm. long (longside). The first series of tubes is placed between the ischium spine and the edge of the sacrum by means of the technique formerly explained, and with the help of the half circle. The lower incision is made somewhat higher than before, about the level of the middle of the arch of the pubis. The second series is placed by means of a superior incision in the region of the anterior superior iliac spine. A pair of long, slightly curved tongs goes from this point straight to just above the sciatic spine, and from there comes out through the lower opening to grip the chain of the second series of radium tubes, and, by pulling back the tongs, to place these tubes into the pelvis. To place the foremost series of tubes, an incision is made in the abdominal wall on the level of the anterior superior spine, between this spine and the middle line. A pair of large tongs is then brought through the fascia and under the peritoneum alongside the bladder, and comes out in the same lower incision, where it grips the third series of tubes, and, by a backward pulling motion, places them into the pelvis. The first two series of tubes are brought with their lower pole on the level of the sciatic spine, the foremost series on the level of the lower edge of the obturator foramen. If the radiogram, taken immediately after the operation, proves that the tubes are placed in the wrong position with regard to the crater, improvement of position is easily practicable, since we easily recognize the different series by means of the different chains, and are able to shift them accurately over a determined length."

Air Cystograms to Demonstrate Prostatic Enlargements that Protrude into the Bladder. EDGAR G. BALLENGER, M. D., OMAR F. ELDER, M. D., and W. F. LAKE, M. D., Am. J. Surg., 28:187-190, August, 1924.

ENLARGEMENT of the prostate gland at the vesical end may be demonstrated in a graphic manner by air cystograms. That part of the prostate gland, the intravesicular portion, which projects like a snoutlike mass into the bladder cannot be examined ordinarily by rectal examination. Such prostatic enlargements can, however, be seen by cystoscopic examinations, but the condition of the patient does not always permit this procedure.

The method employed by the authors, consists in taking the picture at right angles to the long axis of the projecting mass. As far as the authors could determine, the soft tissues, except those that project into the bladder and are more or less surrounded by air to give the necessary contrast in density, cannot be shown. On the other hand, pelvic tumors that press on the bladder are shown clearly. Considerable information may be obtained in determining the extent of the bladder involvement in cancer of the prostate.

Little discomfort is produced by the air in the bladder in those patients who have residual urine and who are free from cystitis. On the other hand, the patients with stones in the bladder and those with a definite inflammatory condition complain considerably, at times, of pain while the air is in the bladder. This may be lessened by novocaine. To reduce the time of discomfort to the minimum, all the preliminary preparations for the exposure should be made before the inflation is accomplished.

Technique employed by the authors consist of: The patient is administered a cathartic, preferably castor oil, 15 to 18 hours before exposure, and a soapsuds enema followed in an hour. The bladder is to be emptied before the examination. A Bucky diaphragm is used, the patient assuming a dorsal position. One ounce of a one per cent solution of novocaine is injected into the bladder through the urethra. In a few minutes a silk woven catheter is passed into the bladder, withdrawing the residual urine which is measured. A rubber band is placed around the penis to keep the air from escaping around the catheter. Air is then injected into the bladder with a bulb or piston syringe until the inflation causes some discomfort. The amount of air that is tolerated in each individual case, of course, depends upon the degree of cystitis or presence of calculi.

The roentgen ray machine having been previously set and the tube adjusted with an angle of 20 degrees, so as to direct the rays toward the pelvic ring, the exposure is made. The air is then allowed to escape through the catheter which is then removed.

The exact technique varies to a certain degree. The time of exposure and the penetration are largely a matter of judgment. With medium sized patients, the best results were obtained with a 3½-inch spark gap, 20 milliamperes and 10 seconds, using superspeed films. With large patients, a 4-inch gap was used.

The object of this method is to show a shadow of soft tissues in a medium of air.

Diathermy in the Treatment of Gonorrhea. WILLIAM S. EHRICH, M. D., F. A. C. S., Urol. & Cutan. Rev., 28:646-649, November, 1924.

SINCE the gonococcus is so sensitive to heat, 99 degrees F. acting as a lethal dose to the organism, the author reasons that thermotherapy ought to be the avenue of attack. Diathermy is the ideal method of applying heat in such conditions because of the depth to which it penetrates. In order to adequately carry out this mode of treatment two things will be essential: First, an apparatus which will deliver a high frequency current without any faradic current; and, second, a means of ascertaining if the part is really receiving the heat. This latter can be easily done by inserting a bulb of an ordinary clinical thermometer into the urethra while the electrodes are on the dorsal and ventral surfaces of the penis.

The Ex-Service Man and His Lungs; A Study of Twelve Hundred Cases. JOHN B. HAWES, 2d, M. D., J. A. M. A., 83:1490-1492, November, 1924.

USING the author's own summary,

1. A study of the ex-service man and his lungs, based upon more than 1,200 cases, shows that tuberculosis and its diagnosis and treatment is the greatest problem.

2. Tuberculosis is wrongly diagnosed chiefly because of too great dependence on roentgen ray evidence.

3. It is obvious that the distinction between active cases requiring hospitalization and inactive cases requiring only supervision should be drawn.

Are There Cases of Foreign Body in the Lung Impossible of Bronchoscopic Removal? CHEVALIER JACKSON, M. D., Reprint, 1921.

IN view of the developments of bronchoscopy, the author believes that there are no fixed limitations to the peroral bronchoscopic removal of foreign bodies that have gone down into the lungs through the natural passages.

Projectiles that have gone in through the chest wall may be too large to be brought up through the natural channels; but any localizable foreign body of appreciable size that has gone down through these channels can be brought back the same way—quickly at the first bronchoscopy in easy cases, at subsequent bronchoscopy in difficult cases.

If mortality be avoided, patient, concentrated work with rubber tube manikin, dog and cadaver will eventually solve any problem of bronchoscopic removal of any localized body of appreciable size. Obviously a small piece of pneumoconiotic material or a very small fragment of peanut kernel, for instance, may get into a tiny branch bronchus and therefore may not be localizable.

The bronchoscopic failures of ten years ago are no criterion of the peroral bronchoscopy of today.

The Nature and Differentiation of Pleural Annular Shadows. J. BURNS AMBERSON, JR., M. D., Am. J. Roentgenol., 12:438-442, November, 1924.

THE author in conclusion emphasizes the following points:

1. Pleural annular shadows are realities which must be distinguished from intrapulmonary cavity shadows.

2. The lesion casting such shadows appears most often to be a subacute or chronic localized pleurisy which often undergoes rapid changes in size. This may be accomplished by a puckering, dimpling, or umbilication of the subjacent pulmonary tissue, and the resulting pleural interstice may contain a small amount of fluid.

3. In most instances pleural annular shadows can be identified by the methods of observation used.

Some Observations on the Use of Roentgen Ray in Diagnosis of Pericarditis. GEORGE W. HOLMES, M. D., J. A. M. A., 83:1745-1747, November 29, 1924.

WITH the combined method of fluoroscopy and teloroentgenography, one should be able to make a diagnosis of pericarditis in a fair percentage of the cases examined. These variations from the normal are looked for:

1. There should be enlargement of the heart shadow, with a tendency to assume the triangular or "water bottle" shape.

2. There should be obliteration of the normal cardiac outline, with inability to distinguish the pulsations of the auricles from those of the ventricles.

3. When fluid is present, there should be change in shape with change in position.

4. In the presence of adhesions, the respiratory movements of the heart may be limited, and the outline irregular.

Medico-Legal Value of X Ray Diagnosis in Fractures. HAROLD SWANBERG, B. Sc., M. D., Illinois M. J., 46:352-353, November, 1924.

"AN x ray in a fracture case is one of the best preventatives for a malpractice suit. In fact it has been repeatedly established by courts in recent years that the failure of the physician to have an x ray made in a fracture is considered evidence of negligence."

To substantiate his contention, the author quotes cases carried into the higher courts by the plaintiff, the cases being decided in favor of the plaintiff.

"Negligence, in respect thereto was charged against the defendent, particularly in that he took no roentgenograms to aid in the diagnosis of the fracture or in ascertaining its condition during the curative process;" and again, "one could not read the record without being forced to the conclusion that the defendant was negligent in at least the one particular of not sooner making a roentgenogram of the elbow so as to enable him to better treat it thereafter."

The Early Diagnosis of Joint Tuberculosis. ALAN DEFOREST SMITH, M. D., J. A. M. A., 83:1569-1573, November 15, 1924.

AMONG the other laboratory tests attempted in the determination of tuberculosis of the joint, the author pays particular attention to the roentgen ray findings. "The roentgen ray examination was considered consistent with tuberculosis in thirty-six of thirty-eight proved cases, and to indicate a condition other than tuberculosis in two. Of the thirty-six, however, the evidence was doubtful in twenty-two. The

earliest cases showed simply an effusion and thickening of the synovia. A little later, a local decalcification with a narrow area of increased subcortical decalcification was seen. Decrease in the width of the joint space was a fairly early sign. Evidence of bone destruction was present in very few of the early cases. A very frequent finding early in the disease in the knee joints, on the contrary, was relative increase in the size of the tibial and femoral epiphyses as well as the patella. This corresponds with the clinical observation that increase in length of the extremity is apt to occur in these cases. This growth was found, however, in two patients who had received immobilization treatment for tuberculosis, and who subsequently were proved not to have tuberculosis."

Treatment of the Convalescent or Intermediate Period of Acute Poliomyelitis. ROGER ANDERSON, B. Sc., M. D., Northwest M., 23:513-516, November, 1924.

THE treatment of the intermediate period of acute poliomyelitis is divided into two stages: (1). The stage of muscle tenderness immediately following the acute stage; and (2). the stage of muscle recovery that begins with the disappearance of muscle tenderness. In the treatment of the second or muscle recovery stage, prevention of deformities, avoidance of fatigue, thermotherapy, massage, and muscle training are used to advantage.

Thermotherapy, more especially that of direct sunlight or of the quartz mercury light, is beneficial not only locally, but generally to the patient. These patients are in need of this type of radiation for they are somewhat anemic both from their previous infection and their prolonged rest in bed. The heat from an ordinary electric thermic globe, when applied to the afflicted extremities will aid in the circulation and this will in turn benefit the muscles.

Massage, administered when the tenderness has disappeared, should be very light at first and then gradually increased, and should never approach the rough kneading type of massage.

Chronic Osteomyelitis as a Factor in Focal Infection of Dental Origin. C. W. LOKEY, D. D. S., Internat. J. Orthod., 10:656-662, October, 1924.

THE first requisite in the aid, and only as an aid, in diagnosis is a good set of radiograms of the mouth. The number of films should be limited only to the requirements of each case and should be rarely ever less than 14 or 16. Each exposure should so overlap the other that when completed each tooth will show on two films, each giving a different angle, and in unusual cases it is often necessary to make several exposures at as many different angles.

The technique of making the radiogram should be very definite in order that all pictures should be uniform and give the best detail. The purpose of the radiogram is to get a picture that will show to the best advantage the different structures of the teeth, bone and gum. Plates that are overexposed burn out the detail of the less dense structure, while those that are too light fail to show the more dense material. There are a great many areas of infection lying concealed under apparently healthy gums. These foci of infection are the result of granulation tissue and osteomyelitis being left, following the extraction of teeth with chronic abscesses or pyorrhea, usually of streptococcic origin.

This osteomyelitic bone shows radiolucent in the radiogram; the cortical plate is found sometimes to be rough and jagged, while in other cases it will appear perfectly normal, the diseased area being confined to the cellular part of the bone. There is disorganization of the bone cells, the trabecula being obliterated or broken down in small particles. In many of these cases there is no distinct dividing line and it is difficult to tell when the disease has been thoroughly eradicated. Sometimes irritation has caused calcareous deposits in the mass.

These osteomyelitic areas often lie under the antrum and it is not unusual to find the floor of the antrum involved. The floor is sometimes covered with polypi or hypertrophied mucous membrane; it is also not uncommon to find large areas of this diseased bone in mouths entirely edentulous, with patients wearing plates. In some cases the cortical plate is found to be soft, a dark color and perforated.

These areas are sometimes manifest in a local neuralgia, a rising temperature, rheumatism, neuritis, and other symptoms coincident with a chronic infection. The areas very seldom cause local pain, and the majority of these cases are negative to the customary sinus picture.

The dental picture in a great many of these cases is very difficult to interpret and it is the opinion of the author that a great number of patients suffering from infections of the antrum are suffering because the radiograms and the clinical findings were too obscure to base a positive diagnosis.

The author substantiates his statements with the presentation of five complete case histories.

The Underlying Cause in the Pathogenesis of Rickets. LEONARD FINDLAY, M. D., J. A. M. A., 83:1473-1480, November 8, 1924.

RICKETS is a very prevalent nutritional disorder characterized by definite pathological findings. The treatment properly handled results in a cure of the condition.

1. Acute rickets can be cured, in an outpatient department, by ultraviolet irradiation, the treatments being given three times a week, without any other antirachitic medication.

2. Ultraviolet irradiation, in combination with cod liver oil, is useful in treating acute rickets, and probably hastens the healing processes more than either ultraviolet rays or cod liver oil alone.

3. Ultraviolet irradiation three times a week, prevents the development of rickets.

If the progress recently made in manufacturing fused quartz continues, it may soon be possible to have quartz windows in every nursery, so that the baby can have its daily sun bath in a warm room. It may soon be possible to devise an electric quartz bulb, simple to operate, harmless and inexpensive, which will give off sufficient actinic rays, with from one-half to one hour's exposure a day, to prevent the occurrence of rickets in babies. A simple light of this sort, could it be made, would be a part of every nursery equipment, and a daily sun bath with the lamp, when the baby could not be exposed to the direct sunlight, would prevent rickets. This would also do away with the necessity of giving cod liver oil as a preventative.

sized that, whereas failure of calcium deposition in the epiphyses is an early and relative pathognomonic

The point is particularly emphamanifestation of rickets, the fact should not be lost sight of that this failure of calcium deposition is only one of the manifestations of the disease.

Rickets should be remembered as a general constitutional disease and any therapeutic agent which is accepted as a cure for rickets must be effective not only in restoring the calcium deposition to normal but also in restoring to normal the whole organism.

Ultraviolet rays seem to accomplish a complete cure for rickets more than any other therapeutic agent alone, though their action may be aided by proper diet, proper hygiene, and the administration of cod liver oil.

Until the cause of rickets has been more fully determined, it must be kept in mind that, in addition to sunlight and cod liver oil, there are other agents that bring about a more complete restoration to normal of all the physiologic functions in the rachitic infant.

Correlation of Clinical, Roentgenologic and Serologic Evidences of Rickets in Breast Fed. L. R. DeBuys, M. D., and Ludo von Meysenbug, M. D., J. A. M. A., 83: 1563-1566, November 15, 1924.

In the words of the authors, "we believe that serologic examination for rickets is the most reliable procedure for determining the activity of the disease; but it is not always of practical application. Positive roentgenographic evidence is of decided value in the diagnosis of the disease. The necessity for the diagnosis of rickets from its clinical manifestations must not be lost sight of, but it must be emphasized that the most dependable of the clinical symptoms, are epiphyseal enlargement and costal beading.....The positive roentgenographic findings, the positive clinical manifestations, and the abnormal blood changes ran parallel."

Electrodiagnosis of Peripheral Nerve Lesions and Infantile Paralysis. Richard Kovacs, M. D., Am. J. Electroth. & Radiol., 42:401-413, November, 1924.

The early diagnosis of peripheral nerve injuries in civil life is of great importance for instituting appropriate and successful therapeutic measures. The technique for nerve and muscle testing is given by the author as follows:

In case of muscle and nerve testing, whether with faradic, galvanic, or with a condenser set, the following elementary rules of technique have to be observed:

1. Preliminary to testing, the parts to be tested are warmed for fifteen minutes' exposure to radiant light and heat or by whirlpool bath.

2. The muscles to be tested and their antagonists must be carefully relaxed.

3. The electrodes are moistened with warm saline, about two per cent; the indifferent electrodes placed, in case of upper extremities, on the back or chest; in case of lower extremities over the sacrum, but always in good contact. The active electrode has a metal disc about three-fourths to an inch in diameter, well padded with gauze and with a make and break key.

4. The operator picks out the individual motor points with an individual strength of current to which they will respond, always comparing the healthy side as to the strength of current needed and the kind of contraction elicited—brief or sluggish. Easily available charts with the motor points marked thereon are of great assistance to beginners. It requires a well trained and experienced operator to take a reliable muscle and nerve test. First, the faradic, then the galvanic current is used, and all findings are accurately charted. A routine examination always includes a condenser set, and only in cases of rapid elimination of malingering or of central lesion are we content with the simple galvanic and faradic tests. In case of very weak muscles in which the testing current "spreads" to the strong antagonist, we apply the galvanic and condenser test by the "bipolar" method. This is carried out by placing two electrodes of equal size directly over the muscle. The concentration of current thus obtained often elicits a response when the normal monopolar method fails.

The nerve and muscle test are repeated every four to eight weeks, on an average in cases under active treatment, in order to check up progress. It is very gratifying, according to the author, to see in some instances how, from a faint flicker of response to the strong interrupted galvanic current at first, there is only a response to the higher value of a condenser set, while later a weak normal response occurs on the same set, gradually turning to normal.

The classical galvanic and faradic test is still the most expeditious way of electrodiagnosis and it will show any nerve involvement within ten days from the date of injury.

The condenser set of electrical nerve testing in conjunction with the above is valuable for charting findings in definite figures and thus provides the means of measuring the progress accurately.

Ultraviolet Ray Therapy in Peritoneal and Glandular Tuberculosis in Children. Henry J. Gerstenberger, M. D., and Spencer A. Wahl, M. D., J. A. M. A., 83:1631-1637, November 21, 1924.

The sole use of ultraviolet rays, as produced by the quartz mercury vapor arc lamp, in the experience of the authors, has been of decided value in the treatment of peritoneal, glandular and osseus tuberculosis.

Of the glandular forms of tuberculosis, the mesenteric is most rapidly improved, followed by the mediastinal and the peripheral.

Pulmonary tuberculosis on the other hand, remains absolutely uninfluenced by ultraviolet ray therapy, even though it is begun early in the course of the disease.

The authors in substantiation of their conclusions cite the history, physical examination, treatment, course and therapeutic results in ten cases, representing the various forms of tuberculosis.

Combination of Modalities in Tuberculous Adenitis. Charles R. Brooke, M. D., Am. J. Electroth. & Radiol., 42:422-431, November, 1924.

The following observations are made:

1. Early and accurate diagnosis should be made by utilizing modern diagnosis methods.

2. Adjunct treatment of all current and intercurrent foci of infection is essential to achieve results.

3. Preference should always be given some nonoperative procedure in tuberculous adenopathies of the cervical region.

4. The effective modalities used are a combination of radiant light and heat energy, local and general ultraviolet ray energy, and the x ray.

5. The combined administration of the ultraviolet rays and the roentgen ray produce prompt and successful results in most cases of this chronic and otherwise resistant affection, and is to be preferred to either modality singly applied.

6. Emphasis is laid on the necessity for careful technique and accurate posology of the physical modalities employed.

7. The physical measures outlined are safe, potent and efficient when judiciously applied, and careful analysis of a number of cases so treated proved that physiotherapy should be placed far in the lead of approved remedies for this intractable disease.

Radiodermatitis and its Treatment. ARTHUR U. DESJARDINS, M. D., and FRED L. SMITH, M. D., New Orleans M. & S. J., 77:177-183, November, 1924.

THE effect of x rays and of radium rays on the skin resembles in many ways that of the sun, except that solar dermatitis and radiodermatitis differ much in the reaction time. The former exposure is followed by its reaction within a few hours, while the latter appears in from five to twenty days. Both cases show exposure reactions varying from erythema to vesication and necrosis.

The mode of treatment depends on the location of the burn, the looseness of the adjoining tissues, the thickness of the tissue and the blood supply. Hychlorite dressings are exceedingly beneficial in cleansing the wound, and seem to stimulate epithelium. At least it is believed by the authors that epithelial cells are not deterred from proliferating by the dilutions used. Hychlorite is preferable to Dakin's solution, the chemical qualities of which are too inconstant.

Sunlight in conjunction with wet dressings is very beneficial.

Paraffin dressings permit the patient to get about, protect the wounds, and apparently the epithelium grows under it, if the surface is kept free from bacterial products. This dressing should be changed every twenty-four hours.

When a film of whitish exudate appears, the use of the wet hychlorite dressings is indicated, and the exudate will usually disappear. The use of paraffin dressings should then be resumed.

In the chronic radiodermatitis of radiologists, half way measures are pernicious. Early radical measures are safer in the long run, and sentiment should not influence the decision as to treatment.

The Ultraviolet Rays in Dermatology. LAWRENCE G. BEINHAUER, M. D., Urol. & Cutan. Rev., 28:639-641, November, 1924.

THE author summarizes his article with the following remarks:

1. Ultraviolet therapy must be added to the armamentarium of dermatological therapeutics.

2. Its use is a selective one.

3. It is a clean, safe, and reasonable method of treatment.

4. Its action is not a specific but rather a helpful agent in the treatment of cutaneous diseases.

5. It is, by far, the most potent agent we possess in the treatment of flat vascular or port wine naevi and x ray dermatitis.